The Ontario Task Force on Employment and New Technology

Employment and New Technology In Ontario's Service Sector: A Summary of Selected Materials

An Appendix to the Final Report

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APPENDIX 12

EMPLOYMENT AND NEW TECHNOLOGY IN ONTARIO'S SERVICE SECTOR: A SUMMARY OF SELECTED INDUSTRIES

This Appendix contains a report prepared for the Ontario Task Force on Employment and New Technology. The topic was approved in advance by the Task Force. At the conclusion of the study, the Task Force had the opportunity to review the report, but its release does not necessarily imply endorsement of the results by the Task Force or its individual members.

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FOREWORD

The Ontario Task Force on Employment and New Technology, a joint labour-management group, was established in May 1984 "to consider and report on the manpower and employment implications of new technologies as the same may be introduced and applied in Ontario during the next decade and the extent and nature thereof."

To inform its discussions, the Task Force established a research agenda designed to gather information on employment and technological change from a wide variety of sources. The research agenda contained projects which gathered information of a historical nature, and projects with a future orientation which were designed to gather information describing likely occupational and employment implications associated with technological change in the 1985-1995 period.

The Appendices to the Final Report of the Ontario Task Force on Employment and New Technology contain reports of these research projects. A complete list of these Appendices may be found at the rear of this document.

Among the Appendices are reports of a series of studies to assess the extent and nature of the employment implications of new technology in selected industries in Ontario. Appendix 3 describes the process by which the industries were selected, and contains the studies' terms of reference which called for particular attention to selected new technologies and occupational groups. Appendices 4-18 contain reports of these industry studies, which were conducted by Currie, Coopers & Lybrand, management consultants.

This particular appendix contains a summary of results obtained from the industries which were selected for study in the service sector.

Dr. Richard L. E. Brown, P.Eng.
Research Director

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Special thanks are due to all industry experts and survey respondents who provided information for this study.

EMPLOYMENT AND NEW TECHNOLOGY IN ONTARIO'S SERVICE SECTOR: A SUMMARY OF SELECTED INDUSTRIES

A Report Prepared by Currie, Coopers & Lybrand
for the Consideration of the Ontario Task Force
on Employment and New Technology

July, 1985

Submitted By: Maureen Farrow
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Currie, Coopers
& Lybrand
Management
Consultants

TABLE OF CONTENTS

		Page
FOREWORD AND ACKNOWLEDGEMENTS		i - iii
1.0	INTRODUCTION	1
1.1	STRUCTURE OF THIS REPORT	2
1.2	STUDY APPROACH	3
2.0	HISTORICAL ANALYSIS	9
2.1	AGGREGATE OUTPUT	9
2.2	EMPLOYMENT	14
2.3	CONCLUSION	21
3.0	ADOPTION OF NEW TECHNOLOGY	25
3.1	NEW TECHNOLOGIES AND RATES OF ADOPTION	25
3.2	FORCES DRIVING THE NEED TO ADOPT NEW TECHNOLOGY	33
3.3	FACTORS THAT COULD SLOW THE RATE OF TECHNOLOGY ADOPTION	37
3.4	CONCLUSION	39
4.0	INDUSTRY OUTLOOK TO 1995	41
4.1	OUTPUT TO 1995	41
4.2	INVESTMENT PATTERNS	45
4.3	EMPLOYMENT TO 1995	49
4.4	CHANGES IN OCCUPATIONAL STRUCTURE	57
5.0	EMPLOYMENT EFFECTS OF NEW TECHNOLOGY	61
5.1	EFFECTS ON OCCUPATIONS	61
5.2	LIKELY STEPS TO DEAL WITH SKILLS OVERSUPPLY	69
5.3	LIKELY STEPS TO COPE WITH SKILL SHORTAGES	69
5.4	TECHNOLOGY IMPACT ON SKILL LEVELS AND JOB CONTENT	69
5.5	TRAINING COSTS AND NEW TECHNOLOGY	73
6.0	LABOUR RELATIONS ENVIRONMENT	77
6.1	TRENDS IN UNIONIZATION	77
6.2	TECHNOLOGY CHANGE CLAUSES	79
6.3	MANAGEMENT'S PERCEPTION OF UNION'S POSITION ON NEW TECHNOLOGY	80
6.4	FORMAL MECHANISMS FOR WORKER PARTICIPATION	83
6.5	VIEWS ON INVOLVING WORKERS IN DECISIONS ON ADOPTING NEW TECHNOLOGY	87

TABLE OF CONTENTS

(Cont'd)

		Page
7.0	PLANNING FOR TECHNOLOGICAL CHANGE	89
7.1	LONG-TERM STRATEGIC PLAN	89
7.2	HUMAN RESOURCE PLAN	89
7.3	CAPITAL INVESTMENT PLAN	89
7.4	PERCEIVED INTEGRATION BETWEEN CAPITAL AND HUMAN RESOURCE PLANS	91
7.5	CONCLUSION	91
APPENDIX A	DESCRIPTION OF SAMPLE FRAME	
APPENDIX B	FIRM EMPLOYMENT SIZE CATEGORIES USED IN THE SURVEY OF SELECTED SERVICE INDUSTRIES	
APPENDIX C	RELIABILITY OF THE SAMPLE	

LIST OF EXHIBITS

		Page
EXHIBIT 1	OUTPUT PERFORMANCE OF SELECTED SERVICE INDUSTRIES COMPARED TO ONTARIO GROSS DOMESTIC PRODUCT	12
EXHIBIT 2	OBSERVATIONS ON INDUSTRY OUTPUT PERFORMANCE FROM 1971 TO 1983	13
EXHIBIT 3	OVERVIEW OF ECONOMIC PERFORMANCE AND KEY ENVIRONMENTAL FACTORS	15
EXHIBIT 4	RATING OF JOB CREATION PERFORMANCE 1971 TO 1981	19
EXHIBIT 5	COMPARISON OF OUTPUT AND EMPLOYMENT GROWTH PERFORMANCE 1971 TO 1981	22
EXHIBIT 6	GENERAL CATEGORIZATION OF COMMON SERVICE TECHNOLOGIES BY TIME PERIOD	26
EXHIBIT 7	TECHNOLOGY DRIVE OF SPECIALIZED TECHNOLOGIES BY INDUSTRY CLUSTER BY TIME PERIOD	30
EXHIBIT 8	DRIVING FACTORS RATED BY IMPORTANCE	34
EXHIBIT 9	SLOWING FACTORS RATED BY IMPORTANCE	38
EXHIBIT 10	COMPARATIVE RATING OF INDUSTRY-WIDE OUTPUT PERFORMANCE AND OUTLOOK	42
EXHIBIT 11	EMPLOYMENT FACTORS RATED BY IMPORTANCE	52
EXHIBIT 12	SUMMARY OF ANTICIPATED TRENDS IN ORGANIZATIONS' OCCUPATIONAL STRUCTURE	60
EXHIBIT 13	FREQUENTLY IDENTIFIED OCCUPATIONS IN WHICH A CHANGE OF SKILLS IS EXPECTED DUE TO TECHNOLOGY ADOPTION	67
EXHIBIT 14	COMPARISON OF TRAINING COSTS	75
EXHIBIT 15	COMPARISON OF FORMAL MECHANISMS FOR WORKER PARTICIPATION	84
EXHIBIT 16	COMPARISON OF PLANNING CAPABILITIES	92

LIST OF TABLES

		Page
TABLE 1	SAMPLE FRAME AND SAMPLE	6
TABLE 2	AVERAGE NUMBER OF PARTICIPANTS PER QUESTIONNAIRE AND EXPERIENCE OF PARTICIPANTS	7
TABLE 3	TRENDS IN AGGREGATE OUTPUT IN CONSTANT DOLLARS	10
TABLE 4	EMPLOYMENT IN ONTARIO	18
TABLE 5	PERCENT OF ORGANIZATIONS PLANNING TO ADOPT NEW TECHNOLOGIES - AVERAGE OF REPORTING ORGANIZATIONS	24
TABLE 6	PERCENT OF ORGANIZATIONS PLANNING TO ADOPT NEW TECHNOLOGIES - SELECTED FINANCE AND INSURANCE INDUSTRIES	27
TABLE 7	PERCENT OF ORGANIZATIONS PLANNING TO ADOPT NEW TECHNOLOGIES - PUBLIC ADMINISTRATION	28
TABLE 8	PERCENT OF ORGANIZATIONS PLANNING TO ADOPT NEW TECHNOLOGIES - TELECOMMUNICATIONS AND BUSINESS SERVICE INDUSTRIES	29
TABLE 9	MOST IMPORTANT FACTORS DRIVING THE NEED TO ADOPT NEW TECHNOLOGIES	32
TABLE 10	MOST IMPORTANT FACTORS THAT COULD SLOW THE RATE OF NEW TECHNOLOGY ADOPTION	36
TABLE 11	AGGREGATE OUTPUT OF SELECTED SERVICE INDUSTRIES IN ONTARIO	40
TABLE 12	ORGANIZATIONS' CAPITAL INVESTMENT PLANS IN ONTARIO	44
TABLE 13	JUSTIFYING FINANCIAL INVESTMENT IN NEW TECHNOLOGY	46
TABLE 14	SOURCE OF FUNDS FOR NEW TECHNOLOGY SPENDING	48
TABLE 15	MOST IMPORTANT FACTORS AFFECTING THE ORGANIZATIONS' EMPLOYMENT IN ONTARIO	50
TABLE 16	ORGANIZATIONS' EMPLOYMENT TRENDS IN ONTARIO	54
TABLE 17	PART-TIME EMPLOYEES AS A PERCENT OF ORGANIZATIONS' TOTAL EMPLOYMENT IN ONTARIO	56
TABLE 18	TRENDS IN ORGANIZATIONS' OCCUPATIONAL STRUCTURE	58

LIST OF TABLES

(Cont'd)

		Page
TABLE 19	IMPACT OF TECHNOLOGY ON SELECTED OCCUPATIONS IN ORGANIZATIONS, PERCENT OF ORGANIZATIONS IDENTIFYING OVERSUPPLY OR SHORTAGE OF SKILLS	62 AND 63
TABLE 20	IMPACT OF TECHNOLOGY ON SELECTED OCCUPATIONS IN ORGANIZATIONS, ANTICIPATED OVERSUPPLY	64
TABLE 21	IMPACT OF TECHNOLOGY ON SELECTED OCCUPATIONS IN ORGANIZATIONS, ANTICIPATED SHORTAGE	65
TABLE 22	MOST LIKELY STEPS ORGANIZATIONS WILL TAKE TO DEAL WITH OVERSUPPLY OF SKILLS	68
TABLE 23	MOST LIKELY STEPS ORGANIZATIONS WILL TAKE TO DEAL WITH SHORTAGE OF SKILLS	70
TABLE 24	IMPACT OF TECHNOLOGY ON SKILL LEVELS AND JOB CONTENT	72
TABLE 25	ORGANIZATIONS' TRAINING COSTS	74
TABLE 26	UNION REPRESENTATION IN ORGANIZATIONS	76
TABLE 27	UNIONS AND TECHNOLOGY CHANGE	78
TABLE 28	NATURE OF WORKER INVOLVEMENT IN THE PROCESS OF TECHNOLOGY CHANGE	82
TABLE 29	TO WHAT EXTENT AND HOW SHOULD MANAGEMENT INVOLVE WORKERS IN DECISIONS ON ADOPTING NEW TECHNOLOGY?	86
TABLE 30	PLANNING FOR TECHNOLOGICAL CHANGE	90

EMPLOYMENT AND NEW TECHNOLOGY IN ONTARIO'S SERVICE SECTOR: A SUMMARY OF SELECTED INDUSTRIES

1.0 INTRODUCTION

This report is one of a series of industry reports which summarize the findings of a major research project[1] undertaken for the Ontario Task Force on Employment and New Technology. The report summarizes the results of the investigation into selected industries in Ontario's service sector which are:

Industry	Standard Industrial Classification (2)
Chartered Banks and Trust Companies	SIC 701
Insurance Carriers - Life and General	SIC 721
Insurance and Real Estate Brokers and Agents, (excluding Real Estate Sales Agents)	SIC 735
Federal Administration	SIC 909
Provincial Administration	SIC 931
Local Government	SIC 951
Telephone Systems (and Interconnects)	SIC 544
Telegraph and Cable Systems	SIC 545
Retail Food	SIC 631
General Merchandise	SIC 642
Computer Services	SIC 853
Offices of Management and Business Consultants	SIC 867

[1] Manpower and Employment Implications of New Technologies in Selected Service Industries in Ontario to 1995. The terms of reference of this assignment can be found in Appendix 3 to the Task Force's final report.

[2] 1970, Standard Industrial Classification (SIC), Statistics Canada.

1.1 Structure of This Report

This report includes four parts:

- The first part (Chapter 1.0) is this Introduction which includes a description of the approach and methodology.

- The second part (Chapter 2.0) summarizes key aspects of the historical reports prepared for each industry from 1971 to 1983 (dependent on the availability of data). More detail can be found in the historical analyses in the specific industry reports (Appendices 13 to 18).

- The third part (Chapters 3.0 to 7.0) discusses the results of the survey of firms in each industry and incorporates the discussions with the industry experts. These chapters cover:

  - a review of output and employment in each of the selected industries from 1971 to 1983,

  - a review of recent and anticipated technology adoptions in each industry,

  - the outlook for each industry to 1995, including expected output and employment levels,

  - effects on employment of new technology such as anticipated occupational shifts and changes in required skills,

  - an overview of the labour relations environment as it relates to new technology, and

- observations on planning efforts for technological change by industry.

- Part four of the report includes various appendices which support the text of individual chapters.

1.2 Study Approach

The study approach selected incorporates the following research techniques:

- analysis of published statistics and reports on the industry, augmented by the working knowledge of industry specialists within Currie, Coopers & Lybrand,

- in-depth interviews with management and labour experts in each industry, conducted at various stages in the project, using structured interview guides, and

- a survey of each industry.

The reasons for the choice of these techniques are explained below.

1.2.1 Historical Analysis

The purpose of the historical analysis was to provide an informed perspective for each industry from which to view future trends. The historical analysis covers: the economic environment, competitive factors, output and employment patterns, productivity, technology adoption and the industrial relations environment. In order to permit cross-industry analysis, consistent indicators and data sources were used. The historical analysis summarized in

this summary report, however, focuses on two key indicators: an appropriate measure of aggregate output and employment levels in Ontario.

1.2.2 Expert Interviews

At various stages in the project, a series of in-depth interviews were conducted with industry leaders, industry associations and union representatives. These experts had a broad understanding of their respective industries in terms of both historical development and future outlook. Their input assisted in the preparation of the historical analysis and in the survey design, and facilitated a clearer interpretation of the survey results.

1.2.3 Sample Survey of Firms

The following describes the key features of the sample survey.

Ontario firms in the selected service industries were identified, using a variety of sources and techniques.

Appendix A provides a discussion of these and the sample frame for each of the service industries investigated.

A representative, random sample of firms, stratified by employment size categories (see Appendix B for categories), was chosen. The senior executive officer of each firm was identified and a structured questionnaire was sent to this individual.

A search was carried out of the Ontario Ministry of Labour Collective Agreements Library to identify unions in the sample firms. Union head offices were contacted to identify the appropriate union leader in each of the unionized firms in the sample. The same questionnaire was sent to union representatives. A copy of the survey questionnaire is attached to each of the individual industry reports.

Consultants provided ongoing assistance to respondents, both on the telephone and in person, to complete the questionnaires. The questionnaire survey process generally ended with a personal interview. The number of firms and unions who participated in the sample survey are shown in Table 1.

In most cases, several participants in each organization contributed to the completion of a questionnaire. For all service industries surveyed, an average of 2.2 participants contributed to a firm questionnaire and 1.6 participants to a union questionnaire. The companies' principal participants had an average of 13.5 years' experience with their firms. The unions' principal participants had an average of 13.7 years with their firms. Table 2 shows these characteristics of respondents, by industry.

The sample survey results have been weighted up to the number of firms in the sample frame. That is, the survey results reported herein refer to the weighted survey results and are, therefore, representative of the sample frame for each industry in Ontario. The reliability of the sample and the degree of error are noted in Table 1. See Appendix C for an explanation of the sample reliability calculation method.

TABLE 1: SUMMARY - SELECTED SERVICE INDUSTRIES

SAMPLE FRAME AND SAMPLE

		UNIVERSE		SAMPLE FRAME				SAMPLE				
SIC	SIC NAME	Number of Firms	Number of Employees	Firm Size Cut Off	Number of Firms	Number of Employees	Share of Universe	Number of Firms	Number of Unions	Number of Employees	Reliability Level (min.) (Percent)	Allowable Error (Percent)
701	Chartered Banks	68	64,200	50	16	60,300	94	8		43,883	95	5
701	Trust Companies	41	20,000	50	22	19,000	95	6		8,466	90	15
721	Life Insurance	45	31,200	$10 MM	26	28,200	90	6		6,355	95	5
721	General Insurance	94	20,000	$10 MM	51	19,000	95	8		2,128	95	9
735	Insurance Brokers	2,737	31,600	50	45	6,300	20	8		1,213	90	11
909	Federal Government	67	91,000	500	22	69,000	76	8	2	28,350	90	11
931	Provincial Government	37	84,000	200	19	67,000	80	8		37,599	90	11
951	Local Government	837	107,474	500	39	83,782	78	10	7	23,832	90	13
544	Telephone Systems and Interconnects	111	30,423	20	37	29,430	97	8	1	26,444	90	23
545	Telegraph and Cable Systems	4	2,543	20	4	2,543	100	3	1	2,116	90	20
631	Food Stores	n.a.	87,600	100	45	85,000	97		Expert Interviews Only			
642	General Merchandise Stores	n.a.	92,000	100	12	76,000	83		Expert Interviews Only			
853	Computer Services	n.a.	16,775	20	41	11,800	70	6		291	90	17
867	Management and Business Consultants	n.a.	10,975	20	40	5,900	54	8		1,070	95	6

TABLE 2: SUMMARY - SELECTED SERVICE INDUSTRIES

Average Number of Participants per Questionnaire and Experience of Participants

SIC	Industry	Organizations		Unions	
		Average Number of Participants per Questionnaire	Average Years in Organization	Average Number of Participants per Questionnaire	Average Years in Organization
701	Chartered Banks	2.4	14.4	n.a.	n.a.
701	Trust Companies	2.7	5.3	n.a.	n.a.
721	Life Insurance	2.2	18.0	n.a.	n.a.
721	General Insurance	1.9	23.7	n.a.	n.a.
735	Insurance Brokers	1.4	15.4	n.a.	n.a.
909	Federal Government	3.6	5.7	1.0	7.0
931	Provincial Government	3.4	10.2	n.a.	n.a.
951	Local Government	2.8	11.1	1.4	15.4
544	Telephone Systems and Interconnects	1.1	9.1	4.0	44.0
545	Telegraph and Cable Systems	3.0	17.7	1.0	37.0
631	Food Stores	n.a.	n.a.	n.a.	n.a.
642	General Merchandise Stores	n.a.	n.a.	n.a.	n.a.
853	Computer Services	1.4	12.0	n.a.	n.a.
867	Management and Business Consultants	1.4	21.8	n.a.	n.a.

n.a. - not applicable

Readers should, however, be cautioned about the nature and reliability of the sample survey results. The questionnaire included a set of questions asking respondents about the future (i.e., five and ten years ahead) from a particular time. The results are, therefore, a representative sample of views about and expectations for the future and should not be viewed as what will take place. The survey provides a useful perspective from which to better understand how the industries studied in the service sector view the future of new technology adoption and its anticipated impacts on employment.

Discussion of the Retail Food and General Merchandising industries is based on a series of expert interviews with key industry sources, not on a sample survey of the two industries. The reason for this treatment is the fact that during the survey (Fall of 1984 to Spring of 1985), these industries were in the midst of significant structural and organizational changes. Firms in these industries invited to participate declined almost universally due to internal priorities and lack of certainty about their futures.

The next chapter of the report discusses the historical output and employment of each industry from 1971 to 1983. Subsequent chapters review the results of the sample survey and expert consultation which discuss the anticipated trends for the period 1985 to 1995.

2.0 HISTORICAL ANALYSIS

This chapter of the report provides an overview of the historical performance from 1971 to the early 1980's of the selected service industries investigated. Two key indicators are used: an appropriate measure of industry output and employment levels in Ontario. These indicators have been selected as they illustrate the level of economic activity and the associated employment trends.

2.1 Aggregate Output

Table 3 shows the service industries, along with an output measure and annual compound rates of growth in constant (1971) dollars for this indicator during four periods of time: 1971 to 1976, 1976 to 1981, and, depending on data availability, 1981 to 1982 and 1982 to 1983. With the exception of Chartered Banks, Trust Companies and Telegraph and Cable Systems, the output measure is for Ontario. For these three industries, only data for Canada are available. As benchmarks for comparison, the table shows growth in the Ontario Gross Domestic Product (GDP) during each period reviewed and the Canada GDP for the total Service Sector (service-producing industries plus government). Comparable figures for the Ontario Service Sector are not available.

Most of the industries reflect the pattern of business cycles during the 1970's and early 1980's which may be briefly described as:

- strong growth in the early 1970's with a cyclical peak in 1974,
- a significant downturn in 1974-75, reflecting the economic recession which was largely driven by the shock of oil shortages and higher energy costs
- a steady recovery from 1976 to 1979, and

TABLE 3: SUMMARY - SELECTED SERVICE INDUSTRIES:

Trends in Aggregate Output in Constant Dollars

SIC	Industry	Output Measure	Area	Annual Compound Rates of Change in Constant (1971) Dollars 1971-1976	1976-1981	1981-1982	1982-1983
701	Banks and Trusts						
	Chartered Banks*	Assets	Canada	6.7%	7.9%	-4.8%	-5.5%
	Trust Companies	Assets	Canada	8.2	8.5	7.1	14.4
721	Insurance Carriers						
	Life	Direct Premiums Written	Ontario	3.3	5.0	n.a.	n.a.
	General	Direct Premiums Written	Ontario	7.3	2.1	n.a.	n.a.
735	Insurance and Real Estate Brokers and Agents Excluding Real Estate Sales Agents	Commissions of Brokers/ Agents	Ontario	7.1	0.8	n.a.	n.a.
909	Federal Administration	Federal Administration Total Expenditures	Ontario	3.9	2.8	10.4	n.a.
931	Provincial Administration	Provincial Administration GDP	Ontario	5.0	1.5	2.8	n.a.
951	Local Government	Local Administration GDP	Ontario	3.8	2.7	4.7	n.a.
544	Telephone Systems	Operating Revenue	Ontario	7.5	7.9	0.9	n.a.
545	Telegraph and Cable Systems	Operating Revenue	Canada	7.8	4.8	-2.9	n.a.
631	Retail Food	Sales Volume	Ontario	2.7 (1972-1976)	-1.7	3.2	2.2
642	General Merchandise	Sales Volume	Ontario	1.8 (1972-1976)	-2.6	-6.4	6.5
853	Computer Services	Operating Revenue	Ontario	6.8 (1973-1976)	9.3	12.8	n.a.
867	Offices of Management and Business Consultants	Operating Revenue	Ontario	-3.9	6.5	0.0	-4.1
	Ontario Gross Domestic Product (GDP)			3.7%	2.0%	-5.5%	4.8%
	Canada GDP: Service Producing Industries plus Government			4.9%	2.9%	-0.8%	1.8%

* Includes bank mortgage loan subsidiaries

- the start of a severe and long recessionary period in 1980, lasting to 1983.

Exhibit 1, based on the data in Table 3, compares the output performance of the selected service industries during the four periods of time as either much greater than the Ontario Gross Domestic Product (GDP) (++), greater than GDP (+), about the same as GDP (o), less than GDP (-), or much lower than GDP (--). Exhibit 2 provides a brief commentary on each industry's output performance during these periods. The following provides some additional comments by industry.

- The financial services industries, as a group, showed a strong performance from 1971 to 1981, with Chartered Banks being hit harder by the recession than Trusts Companies. The chief reason for this difference was that the Chartered Banks serve commercial clients whose businesses were in recession and under strong pressure to reduce debt outstanding while the Trust Companies serve individuals who actually increased savings enabling the Trust Companies to capture an increasing share of personal savings in this period. Life Insurance continued to lose its traditional share of personal savings during the decade, particularly to Banks, Trusts and to Savings Vehicles offered by the Federal Government (i.e., Canada Savings Bonds and Treasury Bills). General Insurance increased its premium income during the high inflation decade but, as an industry, it consistently lost money on its underwriting activity because competitive pressures held premiums below the level required to cover insurance claims.

- The expenditures of the three levels of government as a group remained just ahead of GDP throughout the 1971 to 1981 decade. Their apparent growth in the 1981 to 1982 recession

EXHIBIT 1

OUTPUT PERFORMANCE OF SELECTED SERVICE INDUSTRIES COMPARED TO ONTARIO GROSS DOMESTIC PRODUCT (IN CONSTANT DOLLARS)

SIC	Industry	1971-1976	1976-1981	1981-1982	1982-1983
701	Banks and Trusts				
	Chartered Banks	+	++	o	--
	Trust Companies	++	++	++	++
721	Insurance Carriers				
	Life	o	++	n.a.	n.a.
	General	++	o	n.a.	n.a.
735	Insurance and Real Estate Brokers and Agents, Excluding Real Estate Sales	++	+	n.a.	n.a.
909	Federal Administration	o	+	++	n.a.
931	Provincial Administration	+	-	++	n.a.
951	Local Government	o	+	++	n.a.
544	Telephone Systems	++	++	+	n.a.
545	Telegraph and Cable Systems	++	++	+	n.a.
631	Retail Food	-	--	++	-
642	General Merchandise	--	--	o	+
853	Computer Services	++	++	++	n.a.
867	Offices of Management Business Consultants	--	++	+	-

++ Much greater than GDP
+ Greater than GDP
o About the same as GDP
- Less than GDP
-- Much lower than GDP
n.a. Data not available

EXHIBIT 2

SELECTED SERVICE INDUSTRIES: OBSERVATIONS ON INDUSTRY

OUTPUT PERFORMANCE FROM 1971 TO 1983

SIC	Industry	Comments
701	Banks and Trusts Chartered Banks Trusts and Others	Banks showed good performance growth but lagged Trusts; affected by recession. Trusts showed a strong, steady performance of growth despite recession.
721	Insurance Carriers Life	Life Insurance outperformed GDP overall; led General Insurance 1976 to 1981.
735	General	General Insurance outperformed GDP overall; led Life Insurance 1971 to 1976.
909	Insurance and Real Estate Brokers and Agents excluding Real Estate sales	Insurance Commissions outperformed GDP; followed more closely the performance of General Insurance than Life.
931	Federal Administration	Expenditures were close to GDP; rising cost of unemployment and debt service increased outlays 1982.
951	Provincial Administration	Ontario Government restraint evident in 1976 to 1981; need to maintain services in 1981 to 1982.
544	Local Government	Close to GDP 1971 to 1981; need to maintain services in 1981 to 1982.
545	Telephone Systems	Strong steady performance largely related to regulation of rates by CRTC.
631	Telegraph and Cable Systems	Strong steady performance but downturn during 1982 recession.
	Retail Food	Below performance of GDP with slight recovery in recession due to changes in eating habits.
642	General Merchandise	Well below GDP growth from 1972 to 1982; modest recovery in 1982-83.
853	Computer Services	Strong steady growth building through the 1970's.
867	Offices of Management and Business Consultants	Revenues well below GDP 1973 to 1976 but significantly above GDP 1976 to 1981; real decline in growth during the recession, in 1982-83.

year, compared to a 5.5% drop in GDP, is largely reflected in the need for government to maintain and, in the case of some programs, increase payments such as unemployment insurance during recessionary periods. (The measure of output in this sector is the level of expenditure.)

- The Telecommunications industries showed strong growth throughout the decade with some dampening during the recession.

- The retail industries selected for investigation were weak throughout the decade with modest recovery of food sales during the recession as consumers shifted from eating out to eating at home. General Merchandising sales were weak primarily because of a loss of market share to other types of retailing vehicles.

- The Computer Services industry grew significantly and consistently faster than GDP over the 1970's and early 1980's, while the Business Consulting industry's fortunes fluctuated with the economic business cycles.

Exhibit 3 highlights key cyclical patterns and major environmental factors affecting each of the service industries over the period being reviewed. Further detail is provided in the specific industry reports.

2.2 Employment

In 1981, total employment in the selected service industries was approximately 680,000, representing 16% of all employment in Ontario and 58% of Ontario's employment in the Service Sector.[1]

1 The Service Sector includes Community and Business Services, Trade, Communications, Public Administration, Finance, Insurance and Real Estate.

EXHIBIT 3

SELECTED SERVICE INDUSTRIES: OVERVIEW OF ECONOMIC PERFORMANCE AND KEY ENVIRONMENTAL FACTORS

SIC	INDUSTRY	1971 to 1976	1976 to 1981	1981 to 1983
701	CHARTERED BANKS	Strong steady growth in assets throughout decade (7.4% per annum 1971-1980). Favourable growth factors in 1970's: buoyant economic growth (e.g., savings, consumer durables spending, construction, business financing) favourable legislation (more powers), limited competition with other financial institutions and increased scope of international operations.	Bank mortgage loan subsidiaries increase their share of mortgage market, but banks lose share of personal savings to other institutions.	Dampened growth in 1981-1982; recovery 1982-1983.
	TRUST COMPANIES	Steady, rapid growth in assets throughout decade. Slowdown in new house construction leads to decline in mortgage loan growth. Favourable growth factors in 1970's: growth in housing market, in 1971-1978; related regulations in late 1970's. Further weakening of demand for mortgage loans.	Trust and loan companies gather increased share of personal savings but lost mortgage loan share to bank mortgage subsidiaries. Increased cross-ownership of financial institutions. Major trust mergers take place.	Convergence between Trusts and Life Insurance product lines.
721	LIFE INSURANCE CARRIERS	About same as Ontario GDP. Mature industry: high rates of saturation. High level of competition with other institutions for personal savings (banks, trust companies, credit unions, Federal Government). Share of personal savings has declined from 13.7% in 1976 to 11.9% in 1983. Share of assets has declined from 21.4% in 1971 to 14.5% in 1983. Growth in premiums (deflated by GNP Implicit Price Index)	Higher than GDP. New product offerings (e.g., annuities, RRSP, variable rates).	Increased cross-ownership of financial institutions - convergence of product lines.
	GENERAL INSURANCE CARRIERS	Highly competitive. Over capacity in industry. Underwriting losses 8 out of 10 years from 1973 to 1982. Growth in premium income (deflated by GNP Implicit Price Index) higher than Ontario GDP.	About same as GDP.	Weak economic growth. Slower rates of inflation. Increased popularity of self insurance. Some business failures and corporate consolidations.
735	INSURANCE BROKERS AND AGENTS	Ontario premiums (deflated by GNP Implicit Price Index) increase much faster than GPP in 1971-1976, less so in 1976-1981. Commission rates have declined from 25% in 1960's to 14-15% in 1970's to 13.6% in 1981-1982. Few large firms serve large commercial clients. Large number of small firms.		
901	FEDERAL PUBLIC ADMINISTRATION	Federal expenditures increased share of GNP from 13.4% in 1971 to 19.6% in 1982. Expenditures rose rapidly 1971-1975.	Increased more moderately 1975-1980.	Rose again sharply 1980-1981. High growth driven by unemployment, high debt, and need to maintain services.
		Driving factors: enrichment of social programs, higher unemployment rates, economic development measures, equalization payments, carrying costs of public debt.		
931	PROVINCIAL PUBLIC ADMINISTRATION	Expenditures rose rapidly 1971-1975	Restraint introduced in 1975 and have lagged GPP growth through most of decade. Restraint introduced due to need to address rising debt load of Province.	Expenditures lead GDP due to need to maintain services.
		More rapid population growth and strong revenue growth are factors.	Population growth levels off; revenue growth stable.	Suppressed revenue increases and provincial debt inhibit spending.
951	LOCAL PUBLIC ADMINISTRATION	Moderately high growth 1971-1977 High population growth, urbanization and household formation drive local government expenditure growth.	Little real growth 1977-1979 due to price/wage controls Reduced transfer payments and consumer squeeze, lower population and economic growth dampen spending growth.	Moderate increase in spending 1980-1983. Need to maintain services.

EXHIBIT 3 (CONTINUED)

SIC	INDUSTRY	1971 to 1976	1976 to 1981	1981 to 1983
544	TELEPHONE SYSTEMS AND INTERCONNECTS	Moderately high growth in revenues throughout decade with one exception; decline 1977-1978. Main driving factors - rising number of telephones per household, economic and business expansion, high rates of household formation, increased long distance use and protected revenue base due to regulation of rates. Industry highly regulated.		Increased competition due to moderate deregulation. 1979-buy own equipment 1982-interconnect terminals 1981-intercity services 1984-cellular radio network 1984-"light handed" regulation of selected services Deregulation has brought about a new telephone interconnect industry competing to install business telephone systems. Rapid growth for this segment.
545	TELECOMMUNICATIONS CARRIERS	Strong real growth in revenues 1971-1974. Modest growth 1974-1978. Strong 1978-1979. Modest growth 1979-1981. Main driving factors - telecommunications advances, economic and business expansion, increased services, greater needs of business to communicate effectively. Industry highly regulated.		Decline 1981-1982, due to recession. "Lighter" regulation.
631	RETAIL FOOD	Modest sales increase 1972-1975 (below GDP). Sales peak in 1977. Decline in sales 1976-1981 (below GDP). Major driving factors - population growth, consumer purchasing power, aging population (fewer calories), life styles (e.g., more specialty foods) inflation (e.g., reallocation of food budget) Factors all positive 1972-1976. Mature, competitive industry.	Factors negative 1976-1981. Increased competition. Reduced margins. New store formats.	Increase in food sales. 'No name' products.
642	GENERAL MERCHANDISE	Modest increase. Major driving factors - growth and age of population, personal incomes, competition with other retail segments. Population and purchasing power favourable. 1971-1976.	All factors negative 1976-1981. New store formats. 'No frill' services. Increased specialization. This segment generally slow to respond to changes. Adaptors do well; slow respondents have suffered. Junior department stores have outperformed seniors. General merchandisers have lost to specialty retailers.	Factors continue to be negative.
853	COMPUTER SERVICES	Sharp increase in revenues 1973-1974; subdued 1974-1976. Strong growth 1976-1978. Subdued 1978-1979. EDP equipment rental/lease/sales. Emphasis on rental/lease. Hardware, firmware drive selection. Computer services- Service bureau cost advantage over in-house for many uses.	Emphasis from rental to sale. Market emphasis on application, processing and customization. Availability of software drives selection. In-house computer now more cost-efficient.	Sharp, steady growth 1979-1982. Reduced costs of information technology and software development are main driving factors. Shrinkage in rental/lease segment. Success dependent on finding market niche.
867	OFFICES OF MANAGEMENT AND BUSINESS CONSULTANTS	Management consultants. Decline 1973-1975. Stable 1975-1977. Rise sharply 1977-1978. Decline 1978-1979. Revenues fluctuate with business cycles. Diverse group of specialist business consultants. Limited information available.	Strong steady growth 1979-1981.	Stable 1981-1982. Decline 1982-1983. Increased number of very small firms (under 5 employees). Increasing specialization in services/industry knowledge. Some mergers of larger firms.

The 1981 employment level of the selected service industries, as a group, increased by approximately 43% over the 1971 employment level of approximately 445,000, creating some 193,000 new jobs during the decade. This compares favourably to a 31% rate of increase in total Ontario employment during the decade, but is lower than the employment growth for Ontario's total Service Sector (55%) during this period.

Table 4 presents:

- the 1981 Ontario employment levels of the selected service industries,
- each industry's share of total Ontario employment in 1971 and 1981,
- the number of jobs each industry generated between 1971 and 1981, and
- the average annual compound rates of change in employment growth over the 1971 to 1981 decade.

Also provided as benchmarks for comparison are the average annual compound rates of change over the 1971 to 1981 period for total Ontario employment and for total employment in the Ontario Service Sector.

Based on the employment data in Table 4, Exhibit 4 rates the job creation performance of the selected service industries relative to employment growth in Ontario's total service sector as significantly above average (++), above average (+), about average (o) or below average (-).

Also provided as reference points are the actual jobs created over the decade, thereby suggesting the magnitude of employment growth in each industry.

TABLE 4: SUMMARY - SELECTED SERVICE INDUSTRIES

EMPLOYMENT IN ONTARIO

SIC	Industry	Jobs Created 1971-1981(1)	Share of Total Ontario Employment 1971	Share of Total Ontario Employment 1981	Average Annual Compound Rate of Change 1971-1981	Number of(1) Employees 1981
701	Banks and Other Deposit Accepting Institutions	43,900	1.6%	2.3%	6.4	94,800
	Chartered Banks	26,900			5.4	65,700
	Trusts Companies	12,300			7.3	20,500
721	Insurance Carriers	12,500	1.1	1.1	3.2	46,100
	Life Insurance	7,600			2.7	32,100
	General	4,200			4.7 (1976-1981 only)	20,500
735	Insurance and Real Estate Brokers and Agents	16,400	1.0	1.1	4.4	47,100
	Same, Excluding Real Estate Sales Agents	8,500			3.2	31,300
909	Federal Administration	22,300	2.6	2.5	2.4	105,400
931	Provincial Administration	11,600	1.7	1.6	1.9	65,800
951	Local Government	22,200	1.8	1.9	3.3	80,400
544	Telephone Systems	14,400	0.7	0.9	4.9	37,900
545	Telegraph and Cable System	200	0.1	0.1	1.3	2,400
631	Retail Food(2)	20,400	2.2	2.2	2.9	89,600
642	General Merchandise(2)	16,300	2.6	2.5	1.9	106,600
853	Computer Services	13,100	0.1	0.4	23.2	16,800
867	Offices of Management Business Consultants	7,600	0.1	0.3	17.2	11,000
	Total Ontario Employment				2.8	
	Total Ontario Service Sector Employment (3)				4.5%	

(1) Rounded to nearest hundred employees.
(2) For the period 1972 to 1981.
(3) Includes Health, Education and other Community and Business Services; Trade; Communications; Public Administration; Finance; Insurance and Real Estate.

EXHIBIT 4

RATING OF JOB CREATION PERFORMANCE 1971 TO 1981

FOR SELECTED SERVICE INDUSTRIES

SIC	Industry	Employment Growth Compared to Total Service Sector 1971-1981	Jobs Created 1971-1981 (Closest Hundred)
701	Banks and Other Deposit Accepting Institutions	+	43,900
721	Insurance Carriers	-	12,500
735	Insurance Brokers and Agents	-	8,500
909	Federal Administration	-	22,300
931	Provincial Administration	-	11,600
951	Local Government	-	22,200
544	Telephone Systems	+	14,400
545	Telecommunications	-	200
631	Retail Food	-	20,400(1)
642	General Merchandise	-	16,300(1)
853	Computer Services	++	13,100
867	Business Consultants	++	7,600
		Total	193,000

++ Significantly above average
+ Above average
o About average
- Below average

(1) 1972 to 1981

- Banks and Trusts created about 43,900 jobs during the decade or about 23% of the selected Service Industries combined.

- The three levels of government created about 56,100 jobs during the decade or about 29% of the total for the selected Service Industries.

- Although Computer Services and Business Consultants had the fastest job creation rates, they accounted for only about 11% of the jobs created by the selected Service Industries.

- Insurance carriers, agents and brokers also accounted for about 11% of the total jobs created in the selected industries during the decade.

- The two retailing industries - Retail Food and General Merchandise, generated 36,700 jobs in the period 1972 to 1981, or about 19% of the total.

- The Telecommunications industries accounted for roughly 8% of the total.

In terms of employment growth rate, four industries were strong performers relative to the average growth rate for the total Ontario Service Sector.

- Banks and Trusts,
- Telephone Systems,
- Computer Services, and
- Business Consultants.

The remaining industries grew at a slower rate than the total for the Ontario Service Sector.

2.3 Conclusion

Using the results from Tables 3 and 4, Exhibit 5 compares each of the selected service industry's growth in output, relative to Ontario GDP growth (in constant dollars), and growth in employment, relative to total Ontario employment growth. The purpose of this exhibit is to compare growth in industry activity to growth in employment. That is, does employment growth lag or lead output growth? A few cautionary notes are worth making.

1. The output measure used for each industry is only one indicator of industry activity. The specific industry reports provide several different measures for each industry's historical analysis, and provide a more comprehensive view than the summary report's more narrowly defined output measure.

2. The employment figures are for total employment. They do not distinguish between full-time and part-time or casual employment. For some key service industries, such as Banks, Trusts, and Retailing, there has been a trend toward increased use of part-time employees.

With these notes in mind, Exhibit 5 suggests that, in general, most of the selected services' employment growth rates are comparable to their growth rates in output over the decade. The few apparent exceptions are:

- Bank employment outpaced asset growth, but this may be explained by the increased use of part-time employment over the decade and the limitations of using assets as a measure of total banking activity.

- Life insurance employment growth lagged premium gains. New technology adoption and increased productivity are probable explanations.

EXHIBIT 5

COMPARISON OF OUTPUT AND EMPLOYMENT GROWTH PERFORMANCE

1971 TO 1981 FOR SELECTED SERVICE INDUSTRIES

SIC	Industry	Growth in Output Relative to GDP 1971-1981	Growth in Employment Relative to Total Ontario Employment 1971-1981
701	Banks and Trusts	++	++
	Chartered Banks	+	++
	Trusts and Others	+++	+++
721	Insurance Carriers	+	+
	Life	+	o
	General	+	+
735	Insurance and Real Estate	n.a.	++
	Brokers and Agents excluding Real Estate sales	+	+
909	Federal Administration	o	-
931	Provincial Administration	o	-
951	Local Government	+	+
544	Telephone Systems	++	++
545	Telegraph and Cable Systems	++	-
631	Retail Food	-	o
642	General Merchandise	--	-
853	Computer Services	+++	+++
867	Offices of Management and Business Consultants	-*	+++

Growth in Output Relative to GDP 1971-1981	Growth in Employment Relative to Total Ontario Employment 1971-1981
+++ More than 3 times GDP	+++ More than 3 times average
++ 2 to 3 times GDP	++ 2 to 3 times average
+ Above GDP	+ Above average
o About same as GDP	o Average
- Below GDP	- Below average
-- Less than half of GDP	

n.a. = not applicable.

* The data on this industry are incomplete and may explain the significant difference in below average revenue and strong growth in employment.

- Employment in Federal and Provincial Public Administration lagged expenditure growth and may be explained by the fact that a large share of these expenditures is for transfer payments and debt servicing, and not direct service delivery by Federal employees.

- Employment growth in Telegraph and Cable Systems (Telecommunications Carriers) was essentially static compared to rapid growth in revenues. This may be explained by productivity gains due to new equipment.

- Retail Food employment increased at a moderate rate while sales in constant dollars have declined. This may be explained by the increased use of part-time workers and the highly competitive nature of the industry.

- The output measure for Business Consulting shows below average growth while employment expanded significantly. This anomaly may be explained by the poor quality of data available for this industry in terms of measuring output. This issue is discussed further in the Historical Analysis Chapter (2.0) in the industry report on Computer Services and Business Consulting (Appendix 18 of the Task Force final report).

The next chapters summarize the industry survey results for the selected Service Industries.

TABLE 5: SUMMARY - SELECTED SERVICE INDUSTRIES

Percent of Organizations Planning to Adopt New Technologies by Industry (1)

Technologies	AVERAGE OF REPORTING ORGANIZATIONS Before 1985	1985-1990	1990-1995
CUSTOMER SALES AND SERVICE APPLICATIONS			
Automated Teller Machines (ATMs)	41	31	16
Automatic Cheque Verification	19	30	12
Pay by Phone	0	5	43
Automatic Debit/Credit Systems	40	17	21
Computerized Loan Qualification and Approval	19	57	-
"Smart" Cards (with installed microprocessors)	0	7	27
Home Banking	5	17	33
Connection to Retail Store Point of Sale Network	7	23	16
Computerized Trust Management	27	16	5
Computerized Pension Management	33	22	5
Securities Transfer/Stock Holder Services	27	27	16
On-Line Policy/Client Data Bases	68	33	6
Computerized Insurance Needs Analysis	34	55	6
Computerized Contract Generation	48	42	6
Electronic Claims Processing Systems	50	39	-
Automatic Insurance Verification	49	28	2
Computerized Rating/Underwriting	30	67	0
Brokerage Management Systems	38	44	2
On-Line Terminal for Group Insurance Customers	0	41	21
Others	6	10	2
CUSTOMER AND SERVICE DELIVERY TECHNOLOGIES			
Computerized Service Order Processing	30	54	-
Computerized Client Accounts	76	27	-
Automated Diagnostics (Remote Maintenance)	52	23	16
Customized Telecommuncations Systems	36	-	-
Voice Synthesis Applications	0	20	36
Voice Recognition Applications	0	36	21
Installed Customized Software Systems	83	45	8
Installed Customized Hardware Systems	45	55	8
On-Line Client Access to Data Bases	30	32	48
On-Line Interactive System With Clients	36	38	36
Direct Data Entry from Field	69	36	-
Electronic Service Delivery	25	34	7
Electronic Processing of Service Requests	45	19	7
Computerized Inventory Control	47	45	5
Others	0	3	-
DESIGN TECHNOLOGIES			
Computer-Aided Design (CAD)	15	28	3
Computer-Aided Engineering (CAE)	12	24	3
Computer-Aided Mapping	33	35	-
Computer-Aided Project Management	59	41	-
*4th Generation Computer Languages	35	55	9
Others	5	4	-

Technologies	AVERAGE OF REPORTING ORGANIZATIONS Before 1985	1985-1990	1990-1995
ELECTRONIC FUNDS TRANSFER (EFT)			
Electronic Funds Transfer (EFT) Interbranch	50	33	17
EFT Interbank	44	16	23
EFT Corporate Accounts	24	26	23
EFT Commercial and Retail Accounts	14	22	17
Others	0	-	4
OFFICE AUTOMATION TECHNOLOGIES			
* Mainframe/Minicomputers	86	20	3
* Word Processing	95	16	4
* Electronic Filing	31	52	8
* Microcomputers/Personal Computers	88	18	5
* Internal Data Base Management Systems	63	35	4
* Local Area Networks (LANs)	28	56	7
* Computerized Decision Support Systems	36	48	12
* Voice Activated Computers	2	22	40
* Artificial Intelligence/Expert Systems	3	20	38
* Integrated Work Stations	11	60	18
* Data Base Services (External)	73	18	0
Home Terminals	17	29	-
Others	2	2	2
TELECOMMUNICATIONS TECHNOLOGIES			
* Private Automatic Branch Exchange (PABX)	51	32	8
* Electronic Mail	39	50	10
* Voice Mail	5	40	24
Facsimile with Built-In Microprocessor (FAX)	28	30	19
* Satellite/Microwave Systems	8	12	28
* Videotex	14	20	24
* Video Conferencing	10	33	29
Fibre Optics	3	27	24
Others	2	1	2
OTHER TECHNOLOGIES NOT LISTED ABOVE	3	2	-

(1) 'o' used prior to 1985 to indicate have not adopted. '-' used for period 1985-1990 and 1990-1995 to indicate respondents, at the time of survey are not planning to adopt this technology or 'don't know'. Responses are NOT mutually exclusive.

* common to all service industry questionnaires

3.0 ADOPTION OF NEW TECHNOLOGY

This chapter reports the expected trends in the adoption of new technologies in the selected service industries and the factors driving the need for and affecting the rate of technology adoption. The discussion is based on the survey results and the expert consultation process.

3.1 New Technologies and Rates of Adoption

Table 5 summarizes, for all the selected service industries as a group, the percentage of firms which have adopted various new technologies before 1985, or will by 1990, or will after 1990 and before 1995. Firms may have chosen more than one time period per technology. Generally, however, only one time period was selected. The sample of firms in each industry had a customized list of technologies to which they responded. A group of technologies was common to all service industries. These are noted on Table 5 with an asterisk (*).

Exhibit 6, based on the survey data in Table 5, categorizes the common service technologies by timing as 'already here', 'near-term', or a 'mid-term' technology.

Table 6 presents the results of the survey for the finance and insurance industries on the technologies they have already adopted or plan to adopt between 1985 to 1990 or 1990 to 1995. Table 7 presents the same for the three levels of government: Federal, Provincial, and Local. Table 8 presents the survey results for the Telecommunications, Computer Services and Business Consulting industries.

EXHIBIT 6

GENERAL CATEGORIZATION OF COMMON SERVICE TECHNOLOGIES BY TIME PERIOD

'Already Here' (Widely Adopted Already)	'Near Term' (Widely Planned for 1985 to 1990)	'Mid-Term' (Widely Planned for 1990 to 1995)
Office Automation Technologies		
• Mainframe/ Minicomputer	• 4th Generation Computer Languages	• Voice Activated Computers
• Word Processing	• Electronic Filing	• Artificial Intelligence
• Micro/Personal Computers	• Local Area Networks	
• Internal Data Base Management Systems	• Computerized Decision Support Systems	
	• Integrated Work Stations	
	• Home Terminals	
Telecommunications Technologies		
• Private Automatic Branch Exchange (PABX)	• Electronic Mail	
	• Voice Mail ——→	
• FAX with Built-In Microprocessor ——→		
	• Videotex	
	• Videoconferencing	
	• Satellite/ Microwave Systems	

TABLE 6: SUMMARY - SELECTED FINANCE AND INSURANCE INDUSTRIES

Percent of Organizations Planning to Adopt New Technologies by Industry (1)

Technologies	SIC 701-BANKS			SIC 701-TRUSTS			SIC 721-LIFE			SIC 721-GENERAL			SIC 735 - BROKERS		
	Before 1985	1985-1990	1990-1995	Before 1985	1985-1990	1990-1995	Before 1985	1985-1990	1990-1995	Before 1985	1985-1990	1990-1995	Before 1985	1985-1990	1990-1995
CUSTOMER SALES AND SERVICE APPLICATIONS															
Automated Teller Machines (ATMs)	43	9	-	48	61	39									
Automatic Cheque Verification	23	11	21	13	59	-									
Pay by Phone	0	9	21	0	-	75									
Automatic Debit/Credit Systems	43	21	-	36	11	50									
Computerized Loan Qualification and Approval	25	34	-	11	89	-									
"Smart" Cards (with installed microprocessors)	0	11	-	0	-	64									
Home Banking	9	21	11	0	11	64									
Connection to Retail Store Point of Sale Network	11	32	-	0	11	39									
Computerized Trust Management	11	-	-	48	39	11									
Computerized Pension Management	23	9	-	48	39	11									
Securities Transfer/Stock Holder Services	11	39	-	48	11	39									
On-Line Policy/Client Data Bases							100	21	-	72	28	-	46	46	16
Computerized Insurance Needs Analysis							49	52	-	11	66	-	46	47	16
Computerized Contract Generation							69	31	-	72	28	-	14	61	16
Electronic Claims Processing Systems							90	-	-	61	39	-	16	61	-
Automatic Insurance Verification							62	-	7	59	28	-	32	46	-
Computerized Rating/Underwriting							21	72	-	47	53	-	21	77	-
Brokerage Management Systems							21	52	7	14	53	-	69	32	-
On-Line Terminal for Group Insurance Customers							0	90	-	0	28	-	-	18	55
Others	11	-	-	0	24	24	21	21	-	21	11	-	0	7	-
ELECTRONIC FUNDS TRANSFER (EFT)															
Electronic Funds Transfer (EFT) Interbranch	72	10	-	23	61	39									
EFT Interbank	62	-	10	23	36	39									
EFT Corporate Accounts	44	18	10	0	36	39									
EFT Commercial and Retail Accounts	26	10	-	0	36	39									
Others	0	-	-	0	-	11									
OFFICE AUTOMATION TECHNOLOGIES															
*Mainframe/Minicomputers	75	16	-	100	11	11									
*Word Processing	100	16	-	100	11	11	100	-	-	100	-	-	85	32	-
*Electronic Filing	11	91	-	0	100	11	41	59	-	50	25	11	16	37	23
*Microcomputers/Personal Computers	89	27	-	100	11	11	100	-	-	89	11	11	77	16	-
*Internal Data Base Management Systems	59	48	-	75	64	11	62	38	-	61	39	11	61	23	16
*Local Area Networks (LANs)	0	91	-	39	61	11	38	41	21	11	50	25	37	47	16
*Computerized Decision Support Systems	27	59	-	36	36	39	52	62	7	75	25	-	30	23	16
*Voice Activated Computers	0	27	11	0	-	89	0	31	62	0	14	25	0	-	54
*Artificial Intelligence/Expert Systems	0	11	11	0	11	52	21	21	41	0	14	11	0	-	70
*Integrated Work Stations	11	64	16	0	73	39	41	59	-	0	100	11	16	7	61
*4th Generation Computer Languages	27	39	25	23	61	39	82	38	-	47	53	-	16	30	16
Others										0	11	-			
TELECOMMUNICATIONS TECHNOLOGIES															
*Private Automatic Branch Exchange (PABX)	66	-	25	36	75	11	59	41	-	64	36	-	46	39	16
*Electronic Mail	30	52	27	0	75	11	52	49	-	47	50	-	0	61	23
*Voice Mail	11	39	9	0	23	64	0	52	41	0	36	-	0	-	54
*Facsimile with Built-In Microprocessor (FAX)	39	43	16	0	39	48	21	41	28	42	28	-	14	-	16
*Satellite/Microwave Systems	11	-	-	0	25	39	0	-	82	0	11	14	0	-	54
*Videotex	23	-	11	0	48	39									
*Video Conferencing	0	50	25	0	75	11	0	38	62	0	11	22	7	23	32
*Fibre Optics	0	27	-	0	36	-	0	41	41	0	11	22	0	-	61
Others	0	-	-	0	-	-	21	-	-	0	-	-	7	-	-

(1) '0' used prior to 1985 to indicate have not adopted. '-' used for period 1985-1990 and 1990-1995 to indicate respondents, at the time of survey are not planning to adopt this technology or 'don't know'. Responses are NOT mutually exclusive.

* common to all service industry questionnaires

TABLE 7: SUMMARY - PUBLIC ADMINISTRATION

Percent of Organizations Planning to Adopt New Technologies by Industry (1)

Technologies	SIC 909 - FEDERAL			SIC 931 - PROVINCIAL			SIC 951 - LOCAL		
	Before 1985	1985-1990	1990-1995	Before 1985	1985-1990	1990-1995	Before 1985	1985-1990	1990-1995
SERVICE DELIVERY TECHNOLOGIES									
On-Line Client Data Bases	80	20	-	92	8	-	81	31	-
Direct Data Entry from Field	80	20	-	67	47	-	61	40	-
Electronic Service Delivery	27	20	-	27	53	-	21	30	21
Electronic Processing of Service Requests	54	6	-	40	40	-	42	10	19
Computerized Inventory Control	67	48	13	33	40	-	40	49	-
DESIGN TECHNOLOGIES									
Computer-Aided Design (CAD)	27	46	-	13	20	-	9	63	-
Computer-Aided Engineering (CAE)	13	20	-	13	20	-	19	52	-
Computer-Aided Mapping	40	6	-	27	27	-	31	70	-
Computer-Aided Project Management	80	33	-	67	27	-	31	61	-
*4th Generation Computer Languages	60	40	13	53	60	13	19	100	-
Others	13	-	-	13	13	-	0	10	-
OFFICE AUTOMATION TECHNOLOGIES									
*Mainframe/Minicomputers	100	-	-	93	20	-	70	30	-
*Word Processing	100	-	-	100	27	13	100	10	-
*Electronic Filing	40	46	13	53	60	-	45	55	10
*Microcomputers/Personal Computers	100	-	-	100	27	13	91	28	-
*Internal Data Base Management Systems	87	13	-	93	20	-	40	61	10
*Local Area Networks (LANs)	27	87	13	31	73	-	51	31	-
*Computerized Decision Support Systems	20	80	13	53	73	-	10	39	40
*Voice Activated Computers	0	13	40	0	40	47	0	18	61
*Artificial Intelligence/Expert Systems	0	46	27	0	13	73	0	9	61
*Integrated Work Stations	13	87	13	0	87	13	19	40	21
*Data Base Services (External)	100	-	-	73	27	-	60	30	-
Others	0	13	13						
TELECOMMUNICATIONS TECHNOLOGIES									
*Private Automatic Branch Exchange (PABX)	67	20	-	53	60	13	21	21	9
*Electronic Mail	80	20	-	40	60	-	19	63	9
*Voice Mail	0	60	27	27	47	13	0	21	30
*Facsimile with Built-In Microprocessor (FAX)	60	27	13	40	73	-	0	21	49
*Satellite/Microwave Systems	13	46	13	13	27	13	0	-	40
*Videotex	40	33	13	27	53	13	0	9	21
*Video Conferencing	13	20	40	53	60	13	0	30	19
*Fibre Optics	0	67	27	0	73	13	0	10	9

(1) 'o' used prior to 1985 to indicate have not adopted. '-' used for period 1985-1990 and 1990-1995 to indicate respondents, at the time of survey are not planning to adopt this technology or 'don't know'. Responses are NOT mutually exclusive.
* common to all service industry questionnaires.

TABLE 8: SUMMARY - TELECOMMUNICATIONS AND BUSINESS SERVICE INDUSTRIES

Percent of Organizations Planning to Adopt New Technologies by Industry (1)

Technologies	SIC 544 TELEPHONE			SIC 545 TELECOMMUNICATIONS			SIC 853 - COMPUTER			SIC 867 CONSULTANTS		
	Before 1985	1985-1990	1990-1995	Before 1985	1985-1990	1990-1995	Before 1985	1985-1990	1990-1995	Before 1985	1985-1990	1990-1995
CUSTOMER AND SERVICE DELIVERY TECHNOLOGIES												
Computerized Service Order Processing	33	52	-	75	25	-						
Computerized Client Accounts	65	35	-	75	25	-						
Automated Diagnostics (Remote Maintenance)	65	20	16	25	25	-						
Customized Telecommuncations Systems	49	1	-	25	-	-						
Voice Synthesis Applications	0	17	48	0	25	25						
Voice Recognition Applications	0	33	33	0	25	25						
Installed Customized Software Systems							80	20	-	85	65	15
Installed Customized Hardware Systems							40	60	-	50	50	15
On-Line Client Access to Data Bases							50	50	25	18	23	59
On-Line Interactive Systems with Clients							60	60	20	15	19	50
Others							0	20	-	0	-	-
DESIGN TECHNOLOGIES												
Computer-Aided Design (CAD)	33	1	-	25	25	-	0	20	-	15	15	15
Computer-Aided Engineering (CAE)	16	17	-	50	-	-	0	20	-	15	15	15
*4th Generation Computer Languages	17	49	-	0	75	-	40	60	-	15	65	15
OFFICE AUTOMATION TECHNOLOGIES												
*Mainframe/Minicomputers							80	20	-	96	35	15
*Word Processing	84	16	-	100	-	-	100	-	-	85	46	15
*Electronic Filing	49	33	-	0	100	-	20	40	20	15	50	-
*Microcomputers/Personal Computers							80	20	-	69	31	15
*Internal Data Base Management Systems	49	33	-	100	-	-	60	-	-	46	69	-
*Local Area Networks (LANs)	16	49	-	0	100	-	60	20	-	15	50	-
*Computerized Decision Support Systems	33	33	-	100	-	-						
*Voice Activated Computers	0	17	49	0	-	100	0	60	-	15	15	15
*Artificial Intelligence/Expert Systems	16	16	33	0	75	75	0	40	-	15	15	15
*Integrated Work Stations	1	36	33	25	75	0	0	60	-	15	50	-
*Data Base Services (External)							60	20	-	69	15	-
Home Terminals							0	40	-	31	19	-
Others										19	-	-
TELECOMMUNICATIONS TECHNOLOGIES												
*Private Automatic Branch Exchange (PABX)	65	20	-	50	50	-	60	0	20	39	46	-
*Electronic Mail	68	1	-	50	50	-	20	60	20	46	65	19
*Voice Mail	0	52	1	0	100	-						
*Facsimile with Built-In Microprocessor (FAX)	1	16	16	100	-	-	20	20	20	39	31	15
*Satellite/Microwave Systems	1	1	16	100	-	-	0	-	40	19	15	15
*Videotex	0	1	33	0	25	-	0	-	40	15	15	31
*Video Conferencing	1	16	19	0	-	100	25	0	25	15	46	23
*Fibre Optics	1	20	32	50	50	50	0	-	20	15	15	15
Others	0	-	16	0	50	25						

(1) 'o' used prior to 1985 to indicate have not adopted. '-' used for period 1985-1990 and 1990-1995 to indicate respondents, at the time of survey are not planning to adopt this technology or 'don't know'. Responses are NOT mutually exclusive.

* common to all service industry technologies.

EXHIBIT 7

TECHNOLOGY DRIVE OF SPECIALIZED TECHNOLOGIES BY INDUSTRY CLUSTERS BY TIME-PERIOD

	'Already Here" to 'Near-Term'	'Near' to 'Mid' Term
Banks and Trust Companies	- Electronic Funds Transfer (EFT) - Automatic Teller Machines (ATM) - Automatic Debit/Credit Systems - Automatic Cheque Verification - Securities Transfer/Stock Folder Services - Computerized Trust/Pension Management - Home Banking	- Point of Sale Network - Pay by Phone - Computerized Loan Qualification Approval
Insurance Carriers and Insurance Brokers	- On-line Policy/Client Data Bases - Computerized Insurance Needs Analysis - Computerized Contract Generation - Electronic Claims Processing - Automatic Insurance Verification - Broker Management Systems	- Computerized Rating/Understanding - On-line Terminal for Group Insurance Customers
Federal, Provincial, and Local Government	- On-line Client Data Bases - Direct Data Entry from Field - Electronic Processing of Service Requests - Computer-Aided Mapping - Computer-Aided Project Management	- Electronic Service Delivery Bases - Computer-Aided Design (CAD) - Computer-Aided Engineering (CAE)
Telecommunications	- Computerized Service Order Processing - Computerized Client Accounts - Remote Maintenance - Customized Telecommunications Systems - PABXs - Electronic Mail - Satellite Microwave Systems - Fibre Optics - FAX with Built in Microprocessors	- Voice Synthesis Applications - Voice Recognition Applications - Voice Mail
Retail Food and General Merchandise	- Electronic Cash Registers - Point of Sales Scanners - Optical Scanners - Computerized Inventory Control - Computerized Ordering Systems	- Credit Card Verification - T.V. Shopping - Computerized Sales Aids - Automated Warehousing - Automated Transfers and Set-up - Automatic Teller Machines (ATM) - Electronic Funds Transfer
Computer Services and Business Consultants	- Installed Customized Software Systems Installed Customized Hardware Systems On-line Client Access to Data Bases On-line Interactive Systems with Clients 4th Generation Computer Languages Video Conferencing Electronic Filing	- Integrated Work Status - Home Terminals

Exhibit 7 identifies specialized technologies and applications by service industry clusters by time-period, i.e., 'already here' to 'mid-term' or 'mid-term' to 'near-term'.

It is difficult to categorize industries as technology 'leaders', 'followers' or 'laggers' because of the diversity of applications and different nature of each industry's business. The following are, however, some comments on apparent patterns of technology adoption within service industry clusters, based on the firms surveyed.

- Banks lead Trusts in the use of electronic funds transfer (EFT) and automatic debit/credit systems. Trusts, however, appear to be more open to adopting, or more advanced in their planning, for such technologies as "smart cards" and computerized loan qualification and approval. Both industries appear advanced in their use of and plans for office automation technologies. Banks lead Trusts in the use of various telecommunication technologies.

- Overall, there are few apparent differences between Life and General Insurance Carriers in their use of and plans for new technologies. Insurance Brokers generally follow the Carriers in technology adoptions.

TABLE 9: SUMMARY - SELECTED SERVICE INDUSTRIES

Most Important Factors Driving the Need to Adopt New Technologies
(Percent of Organizations)

Factor		SIC 701 BANKS	SIC 701 TRUST	SIC 721 LIFE	SIC 721 GENERAL	SIC 735 BROKERS	SIC 909 FEDERAL	SIC 931 PROV.	SIC 951 LOCAL	SIC 544 PHONE	SIC 545 TELECON.	SIC 853 COMPUT.	SIC 867 CONSUL.	AVERAGE FOR REPORTING ORGANIZATIONS
COMPETITIVE PRESSURES	First	36	27	49	39	46	0	0	0	1	0	0	31	17
	Second	25	11	0	28	0	0	13	10	1	0	0	31	11
	Third	16	0	21	11	32	0	0	10	18	25	0	15	11
	Wt (1)	1.8	1.1	1.7	1.8	1.7	0.0	0.3	0.3	0.5	0.3	0.0	1.7	0.8
STRATEGIC	First	0	25	0	0	0	0	0	9	0	0	0	0	2
	Second	0	0	0	0	0	0	0	0	0	0	0	0	0
	Third	0	0	21	14	0	0	0	10	0	0	0	0	4
	Wt	0.0	0.8	0.2	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.1
CUSTOMER DEMANDS FOR CHANGES	First	16	11	10	14	23	0	7	0	16	25	40	4	13
	Second	0	14	41	11	0	13	27	9	0	0	0	15	11
	Third	0	0	0	14	0	27	27	0	0	0	0	0	7
	Wt	0.5	0.8	1.1	0.8	0.7	0.5	1.0	0.2	0.5	0.8	1.2	0.4	0.7
INCREASE PROFITABILITY	First	21	11	0	0	0	0	0	0	0	0	0	0	2
	Second	11	0	0	14	16	0	0	0	1	0	0	0	3
	Third	0	25	0	0	0	0	0	0	0	0	20	4	4
	Wt	0.8	0.6	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2
INCREASE PRODUCTIVITY	First	0	0	0	47	32	20	53	51	0	50	0	0	22
	Second	32	0	38	11	7	40	27	0	0	0	0	4	14
	Third	9	11	21	0	14	0	7	0	18	0	0	15	8
	Wt	0.7	0.1	1.0	1.7	1.2	1.4	2.2	1.5	0.2	1.5	0.0	0.2	1.0
INCREASE MANAGEMENT INFORMATION	First	16	0	0	0	0	13	13	21	16	0	0	15	10
	Second	32	0	0	0	0	0	0	10	3	0	0	19	6
	Third	11	52	0	14	32	0	0	19	0	0	0	0	10
	Wt	1.2	0.5	0.0	0.1	0.3	0.4	0.4	1.0	0.6	0.0	0.0	0.9	0.5
LOWER COSTS	First	11	0	21	0	0	13	13	19	0	0	0	31	11
	Second	0	64	0	11	23	27	13	31	16	25	60	15	24
	Third	11	0	0	11	0	6	0	10	16	0	0	0	5
	Wt	0.5	1.3	0.6	0.3	0.5	1.0	0.7	1.3	0.5	0.5	1.2	1.2	0.8
INCREASE SKILLS/ ORGANIZATIONAL CAPABILITY	First	0	25	0	0	0	27	13	0	19	0	20	15	11
	Second	0	11	0	0	16	20	0	19	16	50	0	0	9
	Third	9	0	0	11	0	13	27	0	16	0	0	19	8
	Wt	0.1	1.0	0.0	0.1	0.3	1.3	0.7	0.4	1.1	1.0	0.6	0.7	0.6
ENTER NEW MARKETS/ GROWTH	First	0	0	21	0	0	0	0	0	16	25	20	0	5
	Second	0	0	21	0	16	0	0	0	0	0	0	0	3
	Third	11	0	0	0	0	0	0	0	0	0	20	0	3
	Wt	0.1	0.0	1.0	0.0	0.3	0.0	0.0	0.0	0.5	0.8	0.8	0.0	0.2
OBSOLESCENCE	First	0	0	0	0	0	0	0	0	0	0	0	0	0
	Second	0	0	0	0	0	0	0	0	16	0	20	0	4
	Third	16	0	0	0	0	0	0	0	16	25	0	0	43
	Wt	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.4	0.0	0.1
INCREASE QUALITY	First	0	0	0	0	0	27	0	0	19	0	0	4	5
	Second	0	0	0	11	23	0	20	10	16	25	0	15	11
	Third	0	0	28	0	7	13	13	0	16	0	0	0	5
	Wt	0.0	0.0	0.3	0.2	0.5	0.9	0.5	0.2	1.1	0.5	0.0	0.4	0.4
ALL OTHERS	First	0	0	0	0	0	0	0	0	0	0	20	0	2
	Second	0	0	0	0	0	0	0	9	16	0	20	0	5
	Third	0	11	0	0	0	27	13	9	0	50	0	0	7
	Wt	0.0	0.1	0.0	0.0	0.0	0.3	0.1	0.3	0.3	0.5	1.0	0.0	0.2

(1) Weighted Importance = (First % x 3) + (Second % x 2) + (Third % x 1)

- Federal and Provincial Governments appear close in their use of and plans for new technologies. Local Governments are followers.

- Telephone Systems and the Telecommunications Carriers are leaders in technology adoption, with municipal phone systems and interconnects generally as followers.

- The Computer Services industry appears ahead of the Business Consulting industry in its use of and plans for new technology adoption.

In general, larger organizations appear to be technology leaders in their respective industries.

3.2 Forces Driving the Need to Adopt New Technology

Firms in the service industries studied were asked in a series of open-ended questions to identify the three most important factors driving their need to adopt new technology. Table 9 summarizes the results of the survey. It shows the percentage of firms which named a factor as their most important, second most important and third most important. Table 9 also shows the weighted importance of each factor which is derived by the following formula:

$$\text{Weighted Importance} = (\text{Most Important \%} \times 3)+(\text{Second \%} \times 2)+(\text{Third \%} \times 1)$$

Thus, the most important factors named were given a weighting of three (3); the second most important factors named were given a weighting of two (2); and the third factor named was weighted by one (1). The weighted responses for a factor were then totalled to calculate the weighted importance factor.

EXHIBIT 8
DRIVING FACTORS RATED BY IMPORTANCE

SIC	Industry	First	Second	Third
701	Chartered Banks	Competition	Information	Profit
701	Trust Companies	Cost	Competition	Skills
721	Life Insurance	Competition	Customers	Productivity/ New Markets
721	General Insurance	Competition	Productivity	Customers
735	Insurance Brokers	Competition	Productivity	Customers
909	Federal Administration	Productivity	Skills	Cost
931	Provincial Administration	Productivity	Customers	Cost/ Skills
951	Local Government	Productivity	Cost	Information
544	Telephone Systems	Skills/ Quality	Information	Cost/ New Markets
545	Telecommunications	Productivity	Skills	Customers/ New Markets
631	Retail Food (1)	Cost	Competition	Productivity
642	General Merchandise(1)			
853	Computer Services	Customers/ Cost	New Markets	Obsolescence
867	Business Consultants	Competition	Cost	Information

(1) Based on expert interviews.

A relatively narrow range of forces is driving firms to adopt new technologies. Overall, the organizations in the service industries studied indicate that the critical driving factors are:

	Overall Weighted Importance (1)
• Increased productivity	1.0
• Competitive pressures	0.8
• Lower costs	0.8
• Customer demands for changes	0.7
• Increased organizational skills	0.6
• Increased management information	0.5

(1) Excludes retailing service industries.

The driving factors did vary, by industry, in terms of the motivational focus for technology adoption, as indicated by the overview in Exhibit 8, which summarizes the survey data presented in Table 9.

Exhibit 8 shows that competitive pressures and customer demands for change are the main driving factors in the private sector service industries, while increased productivity is the main driving factor in the public sector. Increased productivity, lower costs and increased profits represent a strong secondary set of factors in the service sector as a whole. Obsolescence of existing equipment and machinery was not a prominent contributing factor.

TABLE 10: SUMMARY - SELECTED SERVICE INDUSTRIES

Most Important Factors That Could Slow the Rate of New Technology Adoption
(Percent of Organizations)

Factor		SIC 701 BANKS	SIC 701 TRUST	SIC 721 LIFE	SIC 721 GENERAL	SIC 735 BROKERS	SIC 909 FEDERAL	SIC 931 PROV.	SIC 951 LOCAL	SIC 544 PHONE	SIC 545 TELECOM.	SIC 853 COMPUT.	SIC 867 CONSUL.	AVERAGE FOR REPORTING ORGANIZATIONS
ABILITY TO FINANCE	First	0	50	0	28	32	46	60	70	33	50	40	36	40
	Second	21	0	28	0	0	13	0	0	0	25	0	0	5
	Third	0	0	0	0	0	13	13	0	0	0	0	0	3
	Wt (1)	0.4	1.5	0.6	0.8	1.0	1.8	1.9	2.1	1.0	2.0	1.2	1.1	1.3
COST OF NEW TECHNOLOGY	First	21	25	50	11	37	13	13	10	32	0	40	18	22
	Second	32	25	0	39	16	0	0	10	35	0	0	23	15
	Third	0	0	0	14	0	13	0	9	0	0	0	0	4
	Wt	1.3	1.3	1.8	1.3	1.4	0.5	0.4	0.6	1.7	0.0	1.2	1.0	1.0
LACK OF GOVERNMENT ASSISTANCE	First	27	0	0	14	0	0	0	0	0	0	20	0	5
	Second	0	0	0	0	0	0	13	0	0	0	0	0	2
	Third	0	0	0	0	0	0	0	0	0	0	0	0	0
	Wt	0.8	0.0	0.0	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.6	0.0	0.2
COMPETITIVE ENVIRONMENT	First	0	0	0	0	0	0	0	0	0	25	0	0	1
	Second	0	0	0	14	16	0	0	0	0	0	0	0	3
	Third	0	11	21	11	0	0	0	0	0	50	20	0	6
	Wt	0.0	0.1	0.2	0.4	0.3	0.0	0.0	0.0	0.0	1.3	0.2	0.0	0.1
POOR ECONOMIC CONDITIONS	First	27	0	0	0	16	0	0	0	32	25	0	18	9
	Second	11	11	0	0	16	0	0	0	0	75	20	0	6
	Third	9	0	0	0	7	0	0	9	0	0	20	0	4
	Wt	1.1	0.2	0.0	0.0	0.9	0.0	0.0	0.1	1.0	2.3	0.6	0.6	0.4
UNION RESISTANCE	First	0	0	0	0	0	0	0	0	0	0	0	0	0
	Second	0	0	0	14	0	0	0	0	0	0	0	0	1
	Third	0	0	0	0	7	0	13	0	0	0	0	0	2
	Wt	0.0	0.0	0.0	0.3	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
EMPLOYEE ACCEPTANCE	First	0	0	0	0	0	0	0	0	0	0	0	0	0
	Second	0	0	0	0	0	0	0	0	0	0	0	0	1
	Third	0	0	0	0	0	0	13	0	0	0	0	0	2
	Wt	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.1
LACK OF SKILLS AND/OR KNOW-HOW TO IMPLEMENT	First	9	25	0	25	0	0	13	10	0	0	0	0	7
	Second	16	39	52	11	23	80	53	21	32	0	60	0	34
	Third	50	14	0	0	0	0	33	10	1	0	0	0	9
	Wt	1.1	1.7	1.0	1.0	0.5	1.6	1.8	0.8	0.8	0.0	1.2	0.0	1.0
LACK OF NEW TECHNOLOGY STANDARDIZATION	First	16	0	0	0	16	27	0	0	0	0	0	0	6
	Second	11	25	0	0	7	0	0	10	1	0	0	0	4
	Third	0	25	0	0	0	33	0	31	48	0	0	5	13
	Wt	0.7	0.8	0.0	0.0	0.6	1.1	0.0	0.5	0.5	0.0	0.0	0.1	0.4
UNWILLINGNESS TO CHANGE	First	0	0	21	11	0	0	13	9	3	0	0	9	6
	Second	0	0	0	0	7	6	20	40	0	0	0	18	10
	Third	0	0	7	11	0	13	13	0	0	25	20	0	7
	Wt	0.0	0.0	0.7	0.5	0.1	0.3	0.9	1.1	0.1	0.3	0.2	0.6	0.5
ALL OTHERS	First	0	0	21	11	0	13	0	0	0	0	0	18	6
	Second	9	0	0	0	0	0	13	9	0	0	0	5	4
	Third	0	11	0	0	16	13	13	10	16	0	0	0	8
	Wt	0.2	0.1	0.6	0.3	0.2	0.5	0.4	0.3	0.2	0.0	0.0	0.6	0.3

(1) Weighted Importance = (First % x 3) + (Second % x 2) + (Third % x 1)

3.3 Factors Which Could Slow the Rate of Technology Adoption

Firms were also asked to name the three most important factors which could slow the rate of technology adoption. Table 10 summarizes the percentage of firms in each industry which identified each factor as first, second or third in importance. Again, the weighted importance of each factor is shown.

Similarly, a limited number of factors were identified which could slow the rate of technology adoption. Overall, for the firms in the service industries surveyed, the critical factors which could slow their rate of technology adoption are:

	Overall Weighted Importance (1)
• Ability to finance/profitability	1.3
• Cost of new technology	1.0
• Lack of skills to implement	1.0
• Unwillingness to change	0.5
• Poor economic conditions	0.4

(1) Excludes retailing service industries.

Again, the critical factors cited which could potentially slow the rate of technology adoption varied by industry. (Exhibit 9).

The most prominent theme is the two-edged factor: the ability to finance the technology and the cost of the technology. Overall economic health is a secondary theme.

EXHIBIT 9
SLOWING FACTORS RATED BY IMPORTANCE

SIC	Industry	First	Second	Third
701	Chartered Banks	Cost	Economy Skills	Government Aid
701	Trust Companies	Skills	Finance	Cost
721	Life Insurance	Cost	Skills	Unwilling
721	General Insurance	Cost	Skills	Finance
735	Insurance Brokers	Cost	Finance	Economy
909	Federal Administration	Finance	Skills	Standardization
931	Provincial Administration	Finance	Skills	Unwilling
951	Local Government	Finance	Unwilling	Skills
544	Telephone Systems	Cost	Finance Economy	Skills Standardization
545	Telecommunications	Economy, Regulation	Finance	Standardization
631	Retail Food(1)	Cost Finance	Skills	Standardization
642	General Merchandise(1)			
853	Computer Services	Finance Skills Cost	Economy	Compete Unwilling
867	Business Consultants	Finance	Cost	Economy Unwillingness

(1) Based on expert interviews.

Lack of skills to implement and unwillingness of the organization (i.e., senior managers or decision makers) to change are a strong secondary theme running through the service industries.

Lack of government assistance is another secondary factor cited by a couple of industries: Banks and Computer Services, as was lack of technology standardization: Federal Government, Telephone Systems and Telecommunications.

The survey clearly demonstrates that service industries do not perceive employee acceptance or union resistance to new technology as factors which will slow their rate of technology adoption.

3.4 Conclusion

Many firms in the selected service industries either have already or plan to adopt many of the new technologies in the near term (i.e., before 1990). The most important factors driving firms to adopt these new technologies are competitive pressures, demands of customers and the need to lower costs, increase productivity and improve product quality. The most significant factors that could slow the rate of technology adoption are poor economic conditions, the firm's level of profitability and the cost of technology.

TABLE 11: SUMMARY - SELECTED SERVICE INDUSTRIES

Aggregate Output of Selected Service Industries in Ontario

SIC	Industry	Output Measure	Average Annual Compound Rate of Change (in Constant Dollars) (1)					
			Estimated			Expected		Actual
			1982-1983	1983-1984	1984-1985	1985-1990	1990-1995	1971-1981
701	Chartered Banks	Assets	-5.5 (2)	1.5	8.5	4.5	3.5	7.3
701	Trust Companies	Assets	14.4 (2)	8.5	6.5	6.5	7.0	8.4
721	Life Insurance (3)	Direct Premiums Written	0.0	4.0	5.0	4.5	4.5	4.1
721	General Insurance (3)	Direct Premiums Written	-1.0	1.5	2.0	2.0	2.0	4.7
735	Insurance Brokers (3)	Commissions	-4.0	-2.5	2.5	1.0	1.0	3.9
909	Federal Government	Expenditures	7.5	9.0	7.0	5.5	5.5	3.7
931	Provincial Government	Provincial GDP	2.0	3.5	3.5	3.5	3.5	3.2
951	Local Government	Local GDP	2.5	3.0	2.5	3.0	3.0	3.2
544	Telephone Systems and Interconnects	Revenue	8.0	7.5	11.0	8.0	9.0	7.7
545	Telegraph and Cable Systems	Revenue	3.5	5.5	3.5	2.5	2.5	6.3
631	Food Stores (4)	Sales	2.5 (5)	-3.0 (8)	0.5	1.0	1.0	0.2 (6)
642	General Merchandise Stores (4)	Sales	0.0 (5)	0.5 (8)	2.0	1.0	1.0	-0.7 (6)
853	Computer Services	Revenue	17.5	17.5	19.0	25.0	19.5	8.2 (6)
867	Management and Business Consultants	Revenue	-2.0 (5)	8.0	7.5	9.0	9.0	2.5 (7)

(1) Rounded to nearest 0.5%.
(2) Actual figures, Canada
(3) Current dollar values reported by respondents deflated to constant dollars using the Consumer Expenditure, Services, Implicit Price Deflator*.
(4) Based on expert interviews only.
(5) 1981 to 1983, actual.
(6) 1972 to 1981.
(7) 1973 to 1981.
(8) Actual 1983, preliminary 1984.

* SOURCE: Statistics Canada; Forecasts by Economics Practice, Currie, Coopers & Lybrand.

4.0 INDUSTRY OUTLOOK TO 1995

This chapter presents the survey results and the views of the experts on the anticipated outlook for the selected service industries in Ontario in terms of aggregate output, investment plans, aggregate employment and changes in occupational structure to 1995.

4.1 Output to 1995

Organizations in the service industries were asked to estimate industry-wide growth, using an appropriate indicator of output in constant dollars. The survey results, by industry, are shown in Table 11. Also provided, as benchmarks for comparison, are actual compound growth rates in output for each industry, from 1971 to 1981, in constant dollars.

The estimates for future growth should be tempered somewhat. That is, although respondents were asked to estimate output in constant dollars(1), some of the survey results for a selected service industry suggest the possibility that some respondents may have expressed their answers in current dollar terms. For example, the Provincial Government expert level respondents believed that current dollar Provincial expenditures would generally just keep pace with inflation during the next ten years. This suggests a zero percent real growth rate whereas the survey respondents in this industry are expecting a 3.5% real growth rate over the next ten years.

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1 There were three exceptions: Life Insurance, General Insurance and Insurance Brokers were asked to estimate future output in current dollars. Their estimates in Table 11 have been adjusted to constant dollars using the following estimates of inflation: 4.0% from 1985 to 1995. These estimates of inflation are supplied by Currie, Coopers & Lybrand's Economics Practice.

EXHIBIT 10

COMPARATIVE RATING OF INDUSTRY-WIDE OUTPUT PERFORMANCE AND OUTLOOK

Industry	Recovery from Recession 1982 to 1985	Outlook Relative to 1971 to 1981 Performance	
		1985 to 1990	1990 to 1995
Chartered Banks	-	-	-
Trust Companies	++	-	-
Life Insurance	+	-	-
General Insurance	+	o	o
Insurance Brokers	-	-	-
Federal Administration	n.a.	+	+
Provincial Administration	n.a.	o	o
Local Government	n.a.	o	o
Telephone Systems	++	o	+
Telecommunications	+	-	-
Retail Food(1)	+*	o	o
General Merchandise(1)	-	-	-
Computer Services	++	+	+
Business Consultants	+	+	+

++ Growth during recession only dampened; very strong post-recession recovery

\+ Strong recovery

o Modest recovery

\- Weak recovery

n.a. not applicable

+* Retail Food: Growth accelerated from 1981 to 1983; flat performance since 1983.

\+ Strong outlook

o Modest outlook

\- Weak outlook

Based on the data in Table 11, Exhibit 10, categorizes each industry's performance from 1982 to 1985 as 'weak' (-), 'modest' (o), or 'strong' (+) recovery relative to the 1981 to 1983 recession. For a few industries, the recession only dampened their growth and they have demonstrated very strong (++) recovery in recent years. The Government sector is not rated as, by necessity, it has to maintain services and does not generally contract during business cycles. Exhibit 10 also categorizes the 1985 to 1990 and 1990 to 1995 outlooks for each as weak (-), moderate (o), or strong (+), relative to each industry's respective performance over the decade 1971 to 1981.

Overall, the exhibit suggests that most service organizations were not as severely affected by the recession as the manufacturing sector. However, most do expect slower growth over the next ten years than that experienced during the 1971 to 1981 decade. The only exceptions are the Federal Government, Telephone Systems, Computer Services and Business Consulting industries which are expecting growth throughout the near and mid-term periods above their respective 1971 to 1981 rates of growth.

However, the growth outlook for three of these industries - Federal Government, Telephone Systems and Business Consulting - is not clear. It appears that some respondents in these industries may have had difficulty in articulating their expectations for their industry in terms of real growth (i.e., constant dollars). This implies that their growth expectations could be discounted by up to, say, 4% per annum over the next ten years.(1) Thus, the only industry expected to clearly grow, in real terms, faster than it did in the 1971 to 1981 period, is the Computer Service industry, even if its forecasts are adjusted for inflation.

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1 Consumer Expenditures, Services, Implicit Price Deflator forecast: 1985 to 1995 - 4.0% per annum. Forecasts by Economics Practice, Currie, Coopers & Lybrand.

TABLE 12: SUMMARY - SELECTED SERVICE INDUSTRIES

Organizations' Capital Investment Plans in Ontario

SIC	Industry		Estimated Investment in Structures and Buildings		Estimated Investment in Machinery and Equipment	
			As a Percent of Total Capital Investment	Percent Related to New Technology	As a Percent of Total Capital Investment	Percent Related to New Technology
701	Chartered Banks	1985 to 1990	10	3	90	84
		1991 to 1995	11	5	89	87
701	Trust Companies	1985 to 1990	6	13	94	80
		1991 to 1995	0	0	100	86
721	Life Insurance	1985 to 1990	6	3	94	66
		1991 to 1995	23	1	78	66
721	General Insurance	1985 to 1990	58	4	42	68
		1991 to 1995	12	3	88	74
735	Insurance Brokers	1985 to 1990	37	0	63	73
		1991 to 1995	10	0	91	66
909	Federal Government	1985 to 1990	16	0	84	66
		1991 to 1995	16	0	84	63
931	Provincial Government	1985 to 1990	5	4	95	62
		1991 to 1995	4	3	96	75
951	Local Government	1985 to 1990	88	2	12	23
		1991 to 1995	90	8	10	25
544	Telephone Systems and Interconnects	1985 to 1990	10	0	90	64
		1991 to 1995	6	12	94	65
545	Telegraph and Cable Systems	1985 to 1990	2	38	98	95
		1991 to 1995	3	38	97	95
631	Food Stores (1)	1985 to 1990	25	10	75	25
		1991 to 1995	25	10	75	25
642	General Merchandise Stores (1)	1985 to 1990	n.a.	n.a.	n.a.	n.a.
		1991 to 1995	n.a.	n.a.	n.a.	n.a.
853	Computer Services	1985 to 1990	11	8	89	88
		1991 to 1995	11	8	89	69
867	Management and Business Consultants	1985 to 1990	0	0	100	70
		1991 to 1995	0	0	100	71
	AVERAGE FOR REPORTING ORGANIZATIONS	1985 to 1990	35	5	65	66
		1991 to 1995	36	5	64	66

(1) Based on expert interviews only.
n.a. - not applicable

4.2 Investment Patterns

Firms were asked about their future capital investment plans over the period 1985 to 1990 and 1990 to 1995. The survey results are shown in Table 12.

In general, firms' responses were incomplete for the mid-term period, that is, they are less certain of their capital spending plans in the period 1990 to 1995.

The table shows that the largest portion of the service industries' capital investment goes toward machinery and equipment as compared to structures and buildings. One prominent exception to this pattern is Local Government which spends approximately 90% of its capital program on structures, buildings and other hard services (e.g., roads, sewers, watermains). Firms in a couple of industries appear to be planning relatively major building programs in the near future, namely: Life and General Insurance and Insurance Brokers. The Telephone Systems have on-going structure and building requirements to maintain and expand their systems in serving the public.

A relatively small share of firms' "bricks and mortar" planned capital spending is related to new technology. Exceptions are the Telephone and Telegraph and Cable Industries, which plan capital expenditures related to expansion and upgrading of their telecommunications systems.

In contrast, a high percentage, on average two-thirds, of the service industries' capital investment in machinery and equipment is expected to be related to new technology. Local Government is again a notable exception. Only about a quarter of municipalities' machinery and equipment capital budgets are related to new technology. This may be explained by the nature

TABLE 13: SUMMARY - SELECTED SERVICE INDUSTRIES

Justifying Financial Investment in New Technology (1)

SIC	Industry	Pay-Back Period: Percent of Organizations Using Pay-Back	Pay-Back Period: Average Period (2)	Return on Investment: Percent of Organizations Using ROI	Return on Investment: Average Rate
701	Chartered Banks	54	3.0	41	n.a.
701	Trust Companies	80	3.0	45	13.0
721	Life Insurance	65	2.5	83	16.0
721	General Insurance	71	3.5	16	n.a.
735	Insurance Brokers	53	4.5	16	15.0
909	Federal Government	25	3.0	0	-
931	Provincial Government	100	3.5	36	15.0
951	Local Government	70	4.0	0	-
544	Telephone Systems and Interconnects	1	5.0	20	19.0
545	Telegraph and Cable Systems	0	-	50	16.0
631	Food Stores (3)	n.a.	-	n.a.	-
642	General Merchandise Stores (3)	n.a.	-	n.a.	-
853	Computer Services	67	3.5	67	20.0
867	Management and Business Consultants	36	2.5	59	25.0
	AVERAGE FOR REPORTING ORGANIZATIONS	52	3.5	32	18.0

(1) Multiple responses accepted.
(2) Closest half a year.
(3) Based on expert interviews only.
n.a. - no answer

of Local Government. A significant part of their machinery and equipment expenditures are related to rolling stock (e.g., buses, trucks, cruisers) and related equipment for the maintenance and expansion of public works (e.g., roads). Excluding Local Government, most of the service industries will be spending over two-thirds of their machinery and equipment capital budgets on new technologies.

4.2.1 Justifying Financial Investment in New Technology

Firms in each industry were asked how they evaluate and justify financially investments in new technology. The results of their responses are shown in Table 13.

The most commonly used measure is the expected pay-back period of the investment, which was used by over 50% of the service industry organizations. The pay-back period ranged from two and a half (2½) to four and a half (4½) years. Insurance Brokers had the longest pay-back period - 4½ years; Life Insurance and Business Consulting the shortest - 2½ years. The average pay-back period for the firms sampled was three and a half (3½) years.

Return on investment (ROI) is used by about 30% of the service organizations for evaluating investment decisions. ROI expectations ranged from 13% to 25%. The average expectation is about 18% ROI which is comparable to an average four year, pay-back period. Telephone Interconnects, Computer Service and Business Consulting firms had the highest ROI expectations.

As is evident from the table, many firms use more than one test for evaluating capital investment decisions in new technology. Firms surveyed were asked if they used any considerations or mechanisms other than pay-back or ROI to evaluate such investments. Approximately 16% of the

TABLE 14: SUMMARY - SELECTED SERVICE INDUSTRIES

SIC	Industry	Source of Funds for New Technology Spending (1)	
		Internal Funds	External Funds
		Percent	Percent
701	Chartered Banks	100	0
701	Trust Companies	70	30
721	Life Insurance	100	0
721	General Insurance	100	0
735	Insurance Brokers	85	15
909	Federal Government	85	15
931	Provincial Government	70	35
951	Local Government	70	30
544	Telephone Systems and Interconnects	82	20
545	Telegraph and Cable Systems	100	0
631	Food Stores (2)	80	20
642	General Merchandise Stores (2)	n.a.	n.a.
853	Computer Services	75	25
867	Management and Business Consultants	85	15
	AVERAGE FOR REPORTING ORGANIZATIONS	85	20

(1) Rounded to closest 5%.
(2) Based on expert interviews only.
n.a. - not available

organizations identified 'strategic' considerations in evaluating decisions on adopting new technologies.

4.2.2 Source of New Capital Spending

Firms in each industry were asked how they will finance their capital programs; from either internal or external sources. The results, by industry, are presented in Table 14.

Approximately 85% of all capital funds for the selected service industries are expected to be generated internally (i.e., from cash flow).

4.3 Employment to 1995

This section reviews the expected trends in employment patterns and the most important factors that will influence employment of firms.

4.3.1 Factors Affecting Employment

Organizations in each industry were asked, in a series of open-ended questions, to identify the most important factors that would affect their organizations' future employment levels in Ontario. The detailed results are shown in Table 15. The same weighted importance procedure, as described above was used to help analyze the survey results.

TABLE 15: SUMMARY - SELECTED SERVICE INDUSTRIES

Most Important Factors Affecting the Organizations' Employment in Ontario
(Percent of Organizations)

Factor		SIC 701 BANKS	SIC 701 TRUSTS	SIC 721 LIFE	SIC 721 GENERAL	SIC 735 BROKERS	SIC 909 FEDERAL	SIC 931 PROV.	SIC 951 LOCAL	SIC 544 PHONE	SIC 545 TELECOM.	SIC 853 COMPUT.	SIC 867 CONSUL.	AVERAGE FOR REPORTING ORGANIZATIONS
PROFITABILITY/ FINANCIAL STRENGTH	First	14	15	0	11	16	0	7	21	0	0	0	0	7
	Second	0	0	0	0	32	0	0	21	16	0	20	0	9
	Third	0	15	52	0	0	0	0	0	0	0	0	15	5
	Wt (1)	0.4	0.6	0.5	0.3	1.1	0.0	0.2	1.0	0.3	0.0	0.4	0.2	0.4
INCREASE SALES/ INCREASE MARKET SHARE	First	0	13	35	15	46	0	0	0	0	25	80	0	17
	Second	14	0	0	0	0	0	0	0	0	0	0	15	3
	Third	19	0	0	0	7	0	0	0	0	0	20	0	4
	Wt	0.5	0.4	1.1	0.4	1.4	0.0	0.0	0.0	0.0	0.8	2.6	0.3	0.8
INTRODUCTION OF NEW TECHNOLOGY	First	0	0	26	0	7	13	0	0	19	50	0	4	7
	Second	24	44	52	22	39	13	27	0	48	0	20	0	23
	Third	14	28	0	12	23	6	13	19	16	25	0	0	11
	Wt	0.6	1.2	1.8	0.6	1.2	0.7	0.7	0.2	1.7	1.8	0.4	0.1	0.8
SUCCESS IN FOREIGN MARKETS	First	0	0	0	0	0	0	0	0	0	0	0	0	0
	Second	0	0	0	0	0	0	0	0	0	25	0	0	1
	Third	0	0	0	0	0	0	0	0	0	0	0	0	0
	Wt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0
AVAILABILITY OF NECESSARY SKILLS	First	14	0	0	0	0	13	0	9	0	0	0	0	3
	Second	0	0	0	0	0	0	0	10	0	0	0	15	3
	Third	14	0	0	0	16	0	0	0	16	0	20	0	6
	Wt	0.5	0.0	0.0	0.0	0.2	0.4	0.0	0.5	0.2	0.0	0.2	0.3	0.2
ABILITY TO COMPETE	First	0	0	0	14	0	0	0	19	17	25	0	15	8
	Second	32	0	9	0	0	6	13	0	0	0	0	15	6
	Third	0	0	26	11	0	13	0	0	0	0	0	0	4
	Wt	0.7	0.0	0.4	0.5	0.0	0.3	0.3	0.6	0.5	0.8	0.0	0.8	0.4
INDUSTRY-WIDE GROWTH	First	14	15	39	22	32	0	27	0	32	0	0	19	17
	Second	0	28	0	11	0	0	13	0	16	25	20	0	6
	Third	14	0	0	0	0	0	0	0	0	25	0	15	3
	Wt	0.5	1.0	1.2	0.9	1.0	0.0	1.1	0.0	1.3	0.8	0.4	0.7	0.7
OVERALL ECONOMIC GROWTH CAPABILITY	First	49	28	0	11	0	13	40	19	32	0	20	31	20
	Second	0	0	26	11	0	13	0	18	0	0	0	39	10
	Third	0	13	0	0	0	13	0	0	16	0	0	0	4
	Wt	1.5	1.0	0.5	0.6	0.0	0.8	1.2	0.9	1.1	0.0	0.6	1.7	0.9
FOREIGN EXCHANGE RATE/CANADIAN COMPETITIVENESS	First	0	0	0	0	0	0	0	0	0	0	0	15	2
	Second	0	0	0	0	0	0	0	0	0	0	20	4	2
	Third	0	0	0	0	0	13	0	0	0	0	0	0	2
	Wt	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.4	0.5	0.1
PRODUCT DIVERSIFICATION	First	0	0	0	0	0	6	0	0	0	0	0	0	1
	Second	19	0	0	0	0	0	13	0	0	0	0	0	3
	Third	0	0	0	0	0	0	27	10	16	0	0	0	6
	Wt	0.4	0.0	0.0	0.0	0.0	0.2	0.5	0.1	0.2	0.0	0.0	0.0	0.1
ALL OTHERS	First	0	0	0	0	0	40	27	21	0	0	0	15	12
	Second	0	0	0	14	14	40	20	40	5	50	0	0	16
	Third	0	0	9	11	0	0	27	9	19	0	0	0	7
	Wt	0.0	0.0	0.1	0.4	0.3	2.0	1.5	1.5	0.3	1.0	0.0	0.5	0.7

(1) Weighted Importance = (First % x 3) + (Second % x 2) + (Third % x 1)

Overall, for the reporting firms, the most important factors are:

	Overall Weighted Importance(1)
• Economic Growth	0.9
• Introduction of New Technologies	0.8
• Industry-Wide Growth	0.7
• Increased Market Share	0.6

(1) Excludes retailing service industries.

Overall, for the service industries, 'economic growth' is perceived as the most important factor influencing the future employment level of the service sector organizations surveyed. It is followed in importance by the introduction of new technologies, industry-wide growth and increases in market share as dominant themes influencing the level of employment over the next ten years.

Exhibit 11 shows variations in employment factors, by industry. All three levels of government identified public policy as the most significant factor that would affect their future employment levels. Technology is the key factor in four of eleven private sector service industries investigated, and a secondary or tertiary factor in four of the remaining seven industries.

In the retail trade sector, market share is rated as the most important factor affecting employment. Industry executives see market share as a driving force behind the rate of store expansion and thus employment levels in the industry. In the retail food store industry, which is more highly unionized than the general merchandise store industry, collective agreements dealing with manning issues are also rated as an important factor affecting employment levels. In both segments of the retail trade sector, government legislation that could change the

EXHIBIT 11

EMPLOYMENT FACTORS RATED BY IMPORTANCE

SIC	Industry	Most Important	Second	Third
701	Chartered Banks	Economic growth	Compete	Technology
701	Trust Companies	Technology	Industry growth	Economic growth
721	Life Insurance	Technology	Industry growth	Sales
721	General Insurance	Industry growth	Technology Economic growth	Compete
735	Insurance Brokers	Sales	Technology	Profitability
909	Federal Administration	Public policy	Economic growth	Technology
931	Provincial Administration	Public policy	Economic growth	Industry growth
951	Local Government	Public policy	Revenue base	Economic growth
544	Telephone Systems	Technology	Industry growth	Economic growth
545	Telecommunications	Technology	Compete Sales Industry growth	Foreign market
631	Retail Food	Market share	Collective Agreements	Legislation
642	General Merchandise	Market share	Legislation	Compete
853	Computer Services	Sales	Economic growth	Technology Industry growth Profitability
867	Business Consultants	Economic growth	Compete	Industry growth

attractiveness of part-time employees is perceived as an important factor which could alter the mix and level of employment in this sector over the next ten years.

As indicated elsewhere in this report, firms require new technology to survive and keep up with their competition. Competition is viewed as almost entirely domestic with virtually no foreign elements, as reflected in the survey results. However, the degree of competition will be greatly influenced by overall economic and industry-wide growth, as indicated by the survey results.

4.3.2 Aggregate Firm Employment Outlook

Firms in each industry were asked to estimate their employment in Ontario in 1981, 1984 and indicate their expectations for firm employment growth in Ontario in 1985, 1990, and 1995. The results are shown in Table 16 in terms of average annual compound rates of growth for each period, by industry. As a benchmark for comparison, the table shows the actual 1981 employment levels in each industry and the actual annual compound rate of change in employment from 1971 to 1981.

A comparison of future employment expectations over the period 1985 to 1995 shows that no service industry expects to create jobs at the same rate as it did in the decade 1971 to 1981. Two industries, Banks and the Federal Government, foresee essentially no employment growth. The Provincial Government and Telephone Systems expect a decline during the 1985 to 1995 decade.

TABLE 16: SUMMARY - SELECTED SERVICE INDUSTRIES

Organizations' Employment Trends in Ontario

SIC	Industry	Average Annual Compound Rate of Change (1)					
		Estimated Rate		Expected Rate		Actual Rate	
		1981-1984	1984-1985	1985-1990	1990-1995	1971-1981	1981 Employment Level (2)
701	Chartered Banks	0.5	1.0	0.0	0.0	5.4	65,700
701	Trust Companies	-2.0	0.5	1.0	1.0	7.3 (3)	28,400
721	Life Insurance	1.0	0.0	2.0	1.0	4.7	32,100
721	General Insurance	0.0	1.5	1.5	1.5	2.7	20,500
735	Insurance Brokers	1.0	2.5	2.5	1.5	3.2	31,300 (4)
909	Federal Government	1.5	3.5	0.0	0.5	2.4	105,400
931	Provincial Government	-0.5	-0.5	-1.0	-0.5	1.9	65,800
951	Local Government	5.5	2.5	1.5	1.0	3.3	80,400
544	Telephone Systems and Interconnects	-2.0	-3.0	0.0	-0.5	4.9	37,900
545	Telegraph and Cable Systems	1.0	2.5	2.5	2.5	1.3	2,400
631	Food Stores (5)	2.5	4.0	2.0	1.5	2.9	92,400
642	General Merchandise Stores (5)	n.a.	n.a.	n.a.	n.a.	1.9	103,200
853	Computer Services	13.5	20.0	21.5	12.5	23.2	16,800
867	Management and Business Consultants	1.0	6.5	4.5	3.5	17.2	11,000

(1) Rounded to closest 0.5%.
(2) Rounded to closest hundred.
(3) 1973-1981
(4) Insurance brokers and agents.
(5) Based on expert interviews only.
n.a. - not available

Every industry foresees a lower growth rate in the mid term (1990 to 1995) as compared to the near term (1985 to 1990). Only a few industries expect growth rates in the near term comparable to those during the 1971 to 1981 period. These industries are:

	Average Annual Compound Rate of Change	
	1971 to 1981 Actual	1985 to 1990 Expected
Insurance Brokers	3.2	2.5
Computer Services	23.2	21.5
Food Stores	2.9	2.0

4.3.3 Trends in Part-Time Work

Increased use of part-time employment is a trend in many service industries. Results of the survey suggest continued increases in the use of part-time workers in the future for most of the selected service industries. The retail trade industries are expecting a continuing high proportion of part-time employees (i.e., 50+% to 60%). The survey results are shown in Table 17.

During the 1981 to 1985 period, most service industries indicated an increase in part-time employment with the exceptions of General Insurance and the Federal Government which experienced declines and Telephone Systems and Interconnects and General Merchandise Stores for which no data are available.

From 1985 to 1995, there is a continued but modest increase in part-time employment expected in the Service Industries. The survey results show the following sectors:

- Trust Companies,

TABLE 17: SUMMARY - SELECTED SERVICE INDUSTRIES

Part-Time Employees as a Percent of Organizations' Total Employment in Ontario (1)

SIC	Industry	Estimated 1981	Estimated 1984	Estimated 1985	Expected 1990	Expected 1995
701	Chartered Banks	13.0	16.0	18.0	18.5	18.5
702	Trust Companies	15.5	15.0	17.5	21.0	25.0
721	General Insurance	10.0	9.5	9.5	9.5	9.5
722	Life Insurance	2.0	3.0	3.0	4.5	5.5
735	Insurance Brokers	1.5	1.5	1.5	2.5	4.0
909	Federal Government	3.5	3.0	2.5	3.0	2.5
931	Provincial Government	9.0	10.0	9.5	11.0	11.0
951	Local Government	34.0	33.0	34.0	35.0	36.5
544	Telephone Systems and Interconnects	n.a.	n.a.	n.a.	n.a.	n.a.
545	Telegraph and Cable Systems	2.0	2.0	3.0	3.5	3.0
631	Food Stores (2)	50.0	60.0	60.0	60.0	60.0
642	General Merchandise Stores (2)	n.a.	n.a.	n.a.	n.a.	n.a.
853	Computer Services	4.5	7.0	6.0	3.0	2.0
867	Management and Business Consultants	1.5	2.0	3.5	4.5	4.5

(1) Rounded to closest 0.5%.
(2) Based on expert interviews only.
n.a. - not available

- Local Government,
- Life Insurance, and
- Insurance Brokers.

A decline in part-time employees over the 1985-1995 decade is expected to occur in:

- Computer Services.

4.4 Changes in Occupational Structure

Firms were also asked about expected changes in the occupational structure of their firm's work force over the next ten years. The results of these questions are reported in Table 18.

The results of Table 18 are summarized in Exhibit 12 which shows the overall direction for occupations in each major category during the period 1981 to 1995. That is, whether the occupation's proportion of the total work force is expected to increase significantly (++), increase (+), decrease significantly (--), or remain about the same (o). The summary for Banks is based on the expert interview results, not the survey results shown in Table 18.

Exhibit 12 suggests a fairly consistent pattern across almost all of the service industries.

- An increasing share in most of the Service Industries' work force in the Managerial, Administrative and Related occupations. Only two industries show a relative decline: Provincial Government and Computer Services.

- An increasing share in most of the Service Industries in the Natural Science, Engineering and Mathematics occupations.

TABLE 18: SUMMARY - SELECTED SERVICE INDUSTRIES

Trends in Organizations' Occupational Structure
(Percent by Occupation) (1)

SIC	Industry	Year	Managerial, Administrative, and Related	Natural Sciences, Engineering and Mathematics	Clerical	Sales	Other	Total
701	Chartered Banks	1981	23	2	69	n.a.	7	100%
		1984	24	2	67	n.a.	7	100%
		1985	24	2	67	n.a.	5	100%
		1990	24	2	66	n.a.	8	100%
		1995	24	2	66	n.a.	9	100%
701	Trust Companies	1981	23	3	71	n.a.	3	100%
		1984	26	5	66	n.a.	3	100%
		1985	26	6	66	n.a.	3	100%
		1990	29	9	59	n.a.	2	100%
		1995	30	11	57	n.a.	2	100%
721	Life Insurance	1981	20	9	56	10	5	100%
		1984	20	8	54	12	6	100%
		1985	20	9	54	12	6	100%
		1990	21	12	51	13	4	100%
		1995	22	13	49	13	4	100%
721	General Insurance	1981	10	7	74	1	8	100%
		1984	10	8	73	1	8	100%
		1985	10	9	72	1	8	100%
		1990	10	9	72	1	8	100%
		1995	10	9	72	1	8	100%
735	Insurance Brokers	1981	10	4	51	26	9	100%
		1984	13	4	49	25	9	100%
		1985	13	4	48	26	9	100%
		1990	13	3	48	28	9	100%
		1995	12	4	46	29	9	100%
909	Federal Government	1981	39	14	30	n.a.	16	100%
		1984	42	15	30	n.a.	14	100%
		1985	42	15	29	n.a.	14	100%
		1990	43	16	28	n.a.	13	100%
		1995	44	16	27	n.a.	13	100%
931	Provincial Government	1981	40	10	34	n.a.	18	100%
		1984	39	10	35	n.a.	16	100%
		1985	38	11	35	n.a.	16	100%
		1990	38	11	35	n.a.	16	100%
		1995	38	12	34	n.a.	16	100%
951	Local Government	1981	10	10	12	n.a.	68	100%
		1984	10	11	12	n.a.	67	100%
		1985	10	11	12	n.a.	67	100%
		1990	11	11	11	n.a.	67	100%
		1995	11	11	11	n.a.	67	100%
544	Telephone Systems and Interconnects	1981	3	6	54	2	36	100%
		1984	3	8	53	2	34	100%
		1985	3	8	53	3	33	100%
		1990	4	9	52	4	32	100%
		1995	3	9	52	4	32	100%
545	Telegraph and Cable Systems	1981	18	14	31	3	34	100%
		1984	20	15	27	3	35	100%
		1985	20	15	27	3	35	100%
		1990	20	15	27	4	35	100%

Several industries show relatively dramatic increases in this major occupational group: Trust Companies, Life Insurance, and Computer Services. The demand in most of these cases appears to be driven by the computer-related requirements of organizations in their respective industries.

- Firms in most service industries surveyed showed a decline in their organizations' proportion of total employment in Clerical occupations. The sharpest shifts are in Banks, Trusts, Life Insurance, Computer Services and Business Consultants. For most of these industries, a significant change has already taken place from 1981 to 1985. For example, Clerical occupations in Trusts went from 71% of the total employment in 1981 to 66% in 1984-1985. Insurance Brokers reduced Clerical occupations from 51% in 1981 to 48% in 1985. Firms in the Telecommunications Carriers industry reduced their Clerical share from 31% in 1981 to 27% in 1984, but no further change is expected.

- The importance of Sales occupations in the service industries is evident from Exhibit 12, as five of seven industries in which the occupation was named indicate that an increasing share of the work force will be in Sales occupations. General Insurance companies and Retailing industries report a relatively constant proportion of their work forces is expected to remain in Sales occupations.

When reviewing Table 18 and Exhibit 12, it should be kept in mind that a reduction in the percentage of the total work force in an industry does not necessarily translate into a loss of jobs in the occupational category because of the growth in the number of total employees over time. Furthermore, there may be changes in specific occupations within the broad occupational categories shown in Table 18. Discussions on expected changes in specific occupations in the major categories discussed here are contained in each of the industry reports.

EXHIBIT 12

SUMMARY OF ANTICIPATED TRENDS IN ORGANIZATIONS' OCCUPATIONAL STRUCTURE

Industry	Managerial Administrative and Related	Natural Sciences, Engineering & Mathematics	Clerical	Sales	Other
Chartered Banks (1)	+	o	--	n.a.	+
Trust Companies	+	++	--	n.a.	-
Life Insurance	o	+	-	o	o
General Insurance	+	++	--	+	-
Insurance Brokers	+	o	-	+	o
Federal Administration	+	+	-	n.a.	-
Provincial Administration	-	+	o	n.a.	o
Local Government	+	+	-	n.a.	o
Telephone Systems	o	+	-	+	-
Telecommunications	o	o	o	+	o
Retail Food(1)	+	+	-	o	o
General Merchandise(1)	+	+	-	o	o
Computer Services	-	++	--	-	-
Business Consultants	+	o	--	+	++

++ Significant increase in occupation's proportion of total employment.
+ Increase in occupation's proportion of total employment.
o Little change in occupation's proportion of total employment.
- Decrease in occupation's proportion of total employment.
-- Significant decrease in occupation's proportion of total employment.

(1) Based on expert interviews.

5.0 EMPLOYMENT EFFECTS OF NEW TECHNOLOGY

This chapter reviews the survey results on the employment effects of new technology in terms of skills match, skill requirements, and impact on skill levels and job content.

5.1 Effects on Occupations

Table 19 summarizes firms' expectations of technology impacts on occupational requirements, by industry. Firms in each industry were asked to identify potential skill shortages (-) or oversupply situations (+) in specific occupations due to technological change. The occupations selected for each industry were chosen, based on an analysis of occupational changes in each industry for the period 1971 to 1981. Where there was a significant proportion of the work force in a specific occupation or an unusual shift in the proportion of the total industry work force during the 1971 to 1981 period, the occupation was selected for the survey.

As a further step, to help the reader, Table 20 lists the selected occupations, by industry, in which 35% or more of the firms surveyed anticipate an oversupply of skills due to the adoption of new technology. Table 21 does the same for the occupations in which a shortage of skills is anticipated.

Occupations shown in capitals (e.g., MANAGERIAL) in Tables 20 and 21 are defined as major occupational groups, while occupations in upper and lower case type (e.g., Systems Analyst) in Tables 20 and 21 are minor occupational groups, as defined by the 1971 Canadian Classification and Dictionary of Occupations.

TABLE 19: SUMMARY - SELECTED SERVICE INDUSTRIES

(1)

Impact of Technology on Selected Occupations in Organizations
Percent of Organizations Identifying OVERSUPPLY (+) or SHORTAGE (-) of Skills

Occupations	SIC 701 BANKS			SIC 701 TRUSTS			SIC 721 LIFE			SIC 721 GENERAL			SIC 735 BROKERS			SIC 909 FEDERAL			SIC 931 PROVINCIAL			SIC 951 LOCAL		
	+	-	NR	+	-	NR	+	-	NR	+	-	NR	+	-	NR	+	-	NR	+	-	NR	+	-	NR
MANAGERIAL, ADMINISTRATIVE AND RELATED																								
• Financial Management	16	43	41	0	100	0	0	48	52	11	78	11	23	23	54									
• Financial Officers	0	43	57	61	39	0	0	48	52	23	66	11	23	23	54	14	73	13	0	100	0	51	40	9
• Personnel and Related																14	40	46	13	67	20	21	51	28
• Government Administrations																14	40	46	20	80	0	10	60	30
• Government Inspectors and Regulators																14	13	73	27	27	46	0	60	40
• All Other Managerial	11	36	52	25	64	11	48	0	52	42	16	42	39	23	39	46	27	27	33	53	13	30	42	28
NATURAL SCIENCES, ENGINEERING AND MATHEMATICS																								
• Engineers																								
• Scientists																0	0	100	33	0	67	42	100	39
• Engineering Technicians and Technologists																0	13	87	13	0	87	30	0	70
• Draughtsmen																			13	7	80	45	43	13
• Systems Analysts and Computer Programmers	42	58	0	0	100	0	39	26	35	28	47	25	16	61	23	27	0	73	20	0	80	82	9	9
																46	40	14	0	87	13	10	79	10
CLERICAL																								
• Clerical Supervisors	38	17	45	36	25	39										60	13	27	47	27	27	81	0	19
• Secretaries	12	30	58	39	50	11	39	9	52	39	14	47	54	23	23	60	13	27	60	13	27	69	21	10
• Typists/ Clerk Typists (including Word Processing Operators)	53	12	35	75	25	0	48	0	52	89	0	11	61	16	23	67	6	27	60	13	27	90	0	10
• Bookkeeping and Accounting Clerks	72	0	28	100	0	0	74	0	26	89	0	11	46	54	0	47	13	40	47	13	40	82	9	9
• Statistical Clerks	0	100	0													33	13	54	40	20	40	40	9	51
• Bank Finance Clerks	39	11	50	73	0	27																		
• Insurance Clerks							48	0	52	75	0	25	32	46	23									
• EDP Equipment Operators	11	43	46	52	25	23	65	0	35	50	36	14	7	54	39	54	13	33	54	33	13	72	10	18
• Library File Clerks	0	0	100				74	0	26	78	0	22	53	16	32	46	13	40	60	13	27	61	9	30
• Claims Adjustors							39	0	61	31	16	53	0	23	77									
• General Office Clerks	50	0	50	100	0	0	74	0	26	89	0	11	46	16	39	33	27	40	33	0	67	70	0	30
• Telephone Operators																								
• Receptionists and Information Clerks	0	100	0																					
• Cashiers and Tellers	25	0	75	73	0	27																		
• All Other Clerks	0	0	100													46	0	54	31	0	69	40	9	51
SALES																								
• Supervisor of Sales							13	35	52	14	14	72	0	39	61									
• Insurance Salesmen and Agents							13	35	52	14	11	75	0	68	32									
OTHER OCCUPATIONS	11	23	66	0	36	64	0	11	89	0	0	100	0	8	92	6	0	87	0	18	82	15	0	85

+ Oversupply - Shortage NR No Response

(1) Blank spaces indicate the occupation was NOT one of selected occupations for the industry.

TABLE 19: SUMMARY - SELECTED SERVICE INDUSTRIES, Continued

(1)

Impact of Technology on Selected Occupations in Organizations
Percent of Organizations Identifying OVERSUPPLY (+) or SHORTAGE (-) of Skills

Occupations	SIC 544 PHONE			SIC 548 TELECOMM.			SIC 853 COMPUTER			SIC 867 CONSULT.			AVERAGE FOR REPORTING ORGANIZATIONS		
	+	-	NR	+	-	NR	+	-	NR	+	-	NR	+	-	NR
MANAGERIAL, ADMINISTRATIVE AND RELATED	1	4	95	0	50	50	0	80	20	5	59	36	1	39	60
• Financial Management													12	54	33
• Financial Officers													21	57	22
• Personnel and Related													16	52	32
• Government Administrations													15	60	26
• Government Inspectors and Regulators													13	33	53
• All Other Managerial													35	34	31
NATURAL SCIENCES, ENGINEERING AND MATHEMATICS															
• Engineers							20	0	80	0	0	100	20	4	76
• Scientists													15	5	81
• Engineering Technicians and Technologists	16	36	48	0	75	25	40	0	60	0	5	95	17	25	59
• Draughtsmen	0	3	97	25	0	75							33	3	64
• Systems Analysts and Computer Programmers	0	52	48	0	25	75	20	80	0	0	27	73	17	58	25
CLERICAL															
• Clerical Supervisors	4	0	96	0	25	75							46	13	42
• Secretaries	4	16	80	0	25	75	0	20	80	23	36	41	38	21	41
• Typists/Clerk Typists (including Word Processing Operators)	3	1	96	25	50	25	20	0	80	46	18	36	55	9	36
• Bookkeepers and Accounting Clerks	0	3	97	50	0	50	60	0	40	9	18	73	53	12	36
• Statistical Clerks													37	11	52
• Bank Finance Clerks													53	7	40
• Insurance Clerks													50	19	31
• EDP Equipment Operators	0	16	84	0	25	75	40	0	60	9	18	73	37	21	42
• Library File Clerks													60	10	31
• Claims Adjustors													19	16	67
• General Office Clerks	4	0	96	25	0	75	20	0	80	23	36	41	44	9	48
• Telephone Operators	4	0	96	0	0	100							3	0	97
• Receptionists and Information Clerks	19	0	81	0	25	75							17	9	73
• Cashiers and Tellers													46	0	54
• All Other Clerks													39	3	58
SALES															
• Supervisor of Sales													8	29	64
• Insurance Salesmen and Agents													8	40	52
OTHER OCCUPATIONS	17	0	83	0	33	67	0	50	50	0	1	99	4	11	85

+ Oversupply - Shortage NR No Response

(1) Blank spaces indicate the occupation was NOT one of selected occupations for the industry.

TABLE 20: SUMMARY - SELECTED SERVICE INDUSTRIES

Impact of Technology on Selected Occupations in Organizations
1985-1995
Anticipated OVERSUPPLY

SIC	Industry	35 Percent or More of Organizations Identify OVERSUPPLY
701	Chartered Banks	Systems Analysts, Clerical Supervisors, Typists, Bookkeeping and Accounting Clerks, Bank Finance Clerks, General Office Clerks
701	Trust Companies	Financial Officers, Clerical Supervisors, Secretaries, Typists, Bookkeeping and Accounting Clerks, Bank Finance Clerks, EDP Equipment Officers, General Office Clerks, Cashiers and Tellers
721	Life Insurance	All Other Managers, Typists, Secretaries, Bookkeeping and Accounting Clerks, Insurance Clerks, EDP Equipment Operators, Library File Clerks, General Office Clerks
721	General Insurance	
735	Insurance Brokers	All Other Managers, Secretaries, Typists, Bookkeeping and Accounting Clerks, Library File Clerks, General Office Clerks
909	Federal Government	All Other Managers, Systems Analysts, Clerical Supervisors, Secretaries, Typists, Bookkeeping and Accounting Clerks, EDP Equipment Operators, Library File Clerks, All Other Clerks
931	Provincial Government	Clerical Supervisors, Secretaries, Typists, Bookkeeping and Accounting Clerks, Statistical Clerks, EDP Equipment Operators, Library File Clerks
951	Local Government	Financial Officers, Engineers, Technicians and Technologists, Draughtsmen, Clerical Supervisors, Secretaries, Typists, Bookkeeping and Accounting Clerks, Statistical Clerks, EDP Equipment Operators, Library File Clerks, General Office Clerks, All Other Clerks
544	Telephone Systems and Interconnects	No oversupply mentioned.
545	Telegraph and Cable Systems	Bookkeeping and Accounting Clerks
631	Food Stores (1)	Cashiers and Tellers, Bookkeeping and Accounting Clerks, Shipping Clerks, Stock Clerks, Secretaries, Typists/Clerk Typists, General Office Clerks, Salespersons/Sales Clerks
642	General Merchandise Stores	n.a.
653	Computer Services	Engineering Technicians and Technologists, Bookkeeping and Accounting Clerks, EDP Equipment Operators
667	Management and Business Consultants	Typists

(1) Based on expert interviews only.
n.a. - not available

TABLE 21: SUMMARY - SELECTED SERVICE INDUSTRIES

Impact of Technology on Selected Occupations in Organizations
1985-1995
Anticipated SHORTAGE

SIC	Industry	35 Percent or More of Organizations Identify SHORTAGE
701	Chartered Banks	Financial Management, Financial Officers, All Other Managers, Systems Analysts, Statistical Clerks, EDP Equipment Operators
701	Trust Companies	Financial Management, Financial Officers, All Other Managers, Systems Analysts, Secretaries
721	Life Insurance	Financial Management, Financial Officers, Systems Analysts (GENERAL only)
721	General Insurance	
735	Insurance Brokers	Systems Analysts, Bookkeeping and Accounting Clerks, Insurance Clerks, EDP Equipment Operators, Supervisors of Sales, Insurance Salesmen
909	Federal Government	Financial Officers, Personnel and Related, Government Administrators, Systems Analysts
931	Provincial Government	Financial Officers, Personnel and Related, Government Administrators, All Other Managers, Systems Analysts
951	Local Government	Financial Officers, Personnel and Related, Government Administrators, Goverment Inspectors and Regulators, NATURAL SCIENCE, ENGINEERING AND MATHEMATICS, Engineering Technicians and Technologists, Systems Analysts
544	Telephone Systems and Interconnects	Engineering Technicians and Technologists, Systems Analysts
545	Telegraph and Cable Systems	MANAGERIAL, ADMINISTRATIVE AND RELATED, Engineering Technicians and Technologists, Typists
631	Food Stores (1)	MANAGERIAL, ADMINISTRATIVE AND RELATED, NATURAL SCIENCE, ENGINEERING AND MATHEMATICS, Sales Supervisors
642	General Merchandise Stores	n.a.
853	Computer Services	MANAGERIAL, ADMINISTRATIVE AND RELATED, Systems Analysts, Other Occupations
867	Management and Business Consultants	MANAGERIAL, ADMINISTRATIVE AND RELATED, Secretaries, General Office Clerks

(1) Based on expert interviews only.
n.a. - not available.

Tables 20 and 21 show many more skill shortages are expected than oversupply situations.

For some occupations, firms in one industry may expect an oversupply while, in another industry, a shortage may be expected for the same occupation.

In the cases of a few occupations, some firms expect an oversupply while others, in the same industry, expect a shortage. In these cases, there is obviously no consensus on the technology impacts on this occupation even within the same industry.

Overall, for the selected Service Industries, a skills surplus is anticipated in the Clerical occupations. Similarly, shortages in the Managerial and Systems Analysts occupations are anticipated. These patterns are shown more clearly in Exhibit 13, which presents a further consolidation, by industry, of frequently identified occupations in which 35% or more of the firms anticipated a change in skills in their organizations.

The most commonly identified occupations were:

- Managerial, Administrative and Related,
- Systems Analysts, and
- Clerical (with no significant change expected in Claims Adjustors, Telephone Operators, and Receptionists and Information Clerks).

EXHIBIT 13

FREQUENTLY IDENTIFIED OCCUPATIONS IN TABLE 19

(35% OR MORE OF ORGANIZATIONS IDENTIFY)

	SHORTAGE		SURPLUS
Industry	Managerial	Systems Analysts	Clerical[1]
Chartered Banks	x	x	x
Trust Companies	x	x	x
Life Insurance	x		x
General Insurance	x	x	x
Insurance Brokers		x	x
Federal Administration	x	x	x
Provincial Administration	x	x	x
Local Government	x	x	x
Telephone Systems		x	
Telecommunications	x		
Retail Food	x		x
General Merchandise	x		x
Computer Services	x	x	
Business Consultants	x		

1 Clerical represents all selected occupations with the exception of Claims Adjustors, Telephone Operators and Receptionists and Information Clerks which had little expected change.

TABLE 22

SUMMARY - SELECTED SERVICE INDUSTRIES

MOST LIKELY STEPS ORGANIZATIONS WILL TAKE TO DEAL WITH OVERSUPPLY OF SKILLS

Industry	Most Commonly	Second Most	Third Most
Chartered Banks	Retrain	Attrition	Job share
Trust Companies	Attrition	Lay-offs	Retrain
Life Insurance	Attrition	Upgrade	Lay-offs
General Insurance	Attrition	Lay-offs	Retrain
Insurance Brokers	Attrition	Retrain	Upgrade
Federal Administration	Retrain	Attrition	Lateral transfer
Provincial Administration	Attrition	Retrain	Lay-offs
Local Government	Attrition	Retrain	Lateral transfer t
Telephone Systems	Lateral transfer	Retrain	Attrition
Telecommunications	Attrition	Retrain	Upgrade
Retail Food	Attrition	Retrain	n.a.
General Merchandise	Attrition	Retrain	n.a.
Computer Services	Attrition	Lateral transfer	Retrain
Business Consultants	Attrition	Shorter hours	Retrain

n.a. Not available or no other answers provided.

5.2 Likely Steps to Deal With Skills Oversupply

In dealing with a potential oversupply of skills in their organizations, the most commonly cited action, across the service industries surveyed, was attrition. The second most frequent response was retraining. The third most common response varied in frequency among job sharing, lay-offs and lateral transfer. All other measures were less frequently mentioned. Table 22 deals with the most likely steps for each industry.

5.3 Likely Steps to Cope With Skill Shortages

In coping with anticipated skill shortages in their organizations, the most commonly cited steps named by firms in the service industries surveyed were, in descending order:

- retraining,
- recruitment, and
- upgrading.

Table 23, over, summarizes the survey results for each industry. The industries showed little variation from these actions.

5.4 Technology Impact on Skill Levels and Job Content

Respondents were asked to rank the impact of new technologies on selected occupations in terms of:

- skills required,
- time to achieve proficiency, and
- knowledge of firms' operations.

TABLE 23

SUMMARY - SELECTED SERVICE INDUSTRIES

MOST LIKELY STEPS ORGANIZATIONS WILL TAKE TO DEAL WITH SHORTAGE OF SKILLS

Industry	Most Commonly	Second Most	Third Most
Chartered Banks	Retrain	Recruit	Upgrade
Trust Companies	Recruit	Retrain	Upgrade
Life Insurance	Recruit	Retrain	Upgrade
General Insurance	Recruit	Retrain	Upgrade
Insurance Brokers	Recruit	Upgrade	Contract
Federal Administration	Retrain	Recruit	Relocate
Provincial Administration	Retrain	Recruit	Upgrade
Local Government	Recruit	Upgrade	Retrain
Telephone Systems	Recruit	Upgrade	Retrain
Telecommunications	Retrain	Recruit	n.a.
Retail Food	Upgrade	Recruit	n.a.
General Merchandise	Retrain	Upgrade	n.a.
Computer Services	Upgrade	Recruit	Retrain
Business Consultants	Retrain	Recruit	Upgrade

n.a. Not available or no other answers provided.

The results are summarized in Table 24. Firms were asked to indicate the impact of technology in terms of increase (+), decrease (-) or remain the same (o).

Table 25 suggests a high degree of consensus that technology will increase the skill level requirements of almost all the selected occupations. The following notes the occupations in which there is a clear consensus across the service industries that technology adoption will require an increase in skills. There were no occupations indicating a consensus on a decrease in skills in relation to new technology adoption.

Occupations In Which Firms Indicate a Clear Consensus That Skills Will Increase

(i.e., 50% or More of the Firms Indicate an Increase)

- Managerial, Administrative and Related
- Natural Sciences, Engineering and Mathematics(1)
- Clerical(2)
- Sales

The pattern of responses to the question about the impact of technology on the time to achieve proficiency were not as clear. The Managerial, Administrative and Related occupations as well as the Sales occupations were expected to require more time to achieve proficiency. The Clerical and Natural Sciences, Engineering and Mathematics occupations had responses which indicated no change or some increase in the time required. The major exceptions to this general pattern were for Receptionists and Information Clerks, Draughtsmen, and Banking and Finance

(1) Only 25 percent of those firms with other engineers expected an increase in skill levels.
(2) Banking and Finance Clerks, and Reception and Information Clerks had responses for skill increase of 47% and 45% of respondents, respectively, and 34% of firms indicated that there would be a decline in skills for Banking and Finance Clerks.

TABLE 24: SUMMARY - SELECTED SERVICE INDUSTRIES

Impact of Technology on Skill Levels and Job Content

	Percent of Organizations								
	Skills Required			Time to Achieve Proficiency			Knowledge of Organization's Operations		
Occupations	+	-	0	+	-	0	+	-	0
MANAGERIAL, ADMINISTRATIVE AND RELATED	94	0	6	47	17	36	58	0	42
• Financial Management	82	-	18	55	11	34	59	3	38
• Financial Officers	87	7	6	53	15	32	54	5	41
• Personnel Officers	88	5	7	56	10	34	57	-	43
• Government Administrators	100	-	-	63	5	32	68	8	23
• Government Inspectors and Regulators	79	-	21	32	17	51	39	6	55
• Other Managerial	91	-	9	68	7	26	72	4	24
NATURAL SCIENCES, ENGINEERING AND MATHEMATICS									
• Electrical Engineers	62	-	38	-	-	100	24	-	76
• Other Engineers	25	38	38	-	-	100	24	-	76
• Engineers	69	5	26	38	-	62	34	-	66
• Scientists	85	-	15	51	13	36	34	-	66
• Engineering Technicians	72	14	14	46	27	27	28	-	72
• Technologists and Technicians (Science and Engineering)	82	-	18	46	15	39	41	-	59
• Draughtsmen	59	22	19	30	35	35	39	12	50
• Systems Analysts and Computer Programmers	71	5	24	56	11	32	68	1	31
CLERICAL									
• Secretaries	82	7	12	41	20	40	45	5	49
• Typist/Clerk Typist (includes Word Processing Operators)	74	15	12	31	21	48	36	10	54
• Bookkeepers and Accounting Clerks	61	23	16	30	24	47	28	15	57
• Cashiers and Tellers	33	19	48	13	19	68	34	-	66
• EDP Equipment Operators	56	20	25	30	23	47	28	10	61
• Stock Clerks	100	0	0	100	0	0	0	0	100
• All Other Clerks (includes Receptionists, Information Clerks, Telephone Operators)	81	-	19	70	-	30	46	-	54
• Clerical Supervisors	88	5	7	57	19	25	57	8	36
• Statistical Clerks	60	10	30	33	36	42	20	6	75
• Banking and Finance Clerks	47	34	18	29	34	37	30	17	52
• Insurance Clerks	83	9	7	54	14	33	60	11	30
• Library File Clerks	53	24	23	24	28	48	27	10	63
• Claims Adjusters	59	19	22	42	12	46	56	-	44
• Office Clerks	57	21	22	31	22	47	33	13	55
• Receptionists and Information Clerks	45	-	55	22	45	33	27	-	73
• All Other Clerks	51	21	29	27	29	44	21	8	72
SALES	72	-	28	60	51	18	79	8	13
• Supervisor: Sales (e.g. Department Manager, Store Manager)	81	7	12	72	7	21	65	-	35
• Insurance Salesmen and Agents	71	6	24	55	9	36	50	-	50
• Other Sales Occupations	100	-	-	89	11	-	89	-	11

Clerks, all of which were expected to require less time to achieve proficiency. The response levels were, however, less than 45%.

Most firms expected technology adoption to increase the need of their employees to have enhanced knowledge of the organization's operations in the Managerial, Administrative and Related and Sales occupations. For most of the Natural Science, Engineering and Mathematics occupations and Clerical occupations, no change in company knowledge because of technology adoptions was expected. The response rates indicating a reduction in the required knowledge of the organization were all insignificant.

5.5 Training Costs and New Technology

Firms in the selected service industries currently estimate spending an average of 2.0% to 6.0% of total labour costs on training. Firms in the Computer Services and Telephone Systems industries spent significantly more than other industries on training as a proportion of total labour costs. Overall, training costs increased most from 1984 to 1985, with less change expected to 1990. In fact, several industries - Computer Services, Chartered Banks, Telephone Systems and Provincial Governments - expected declines between 1985 and 1990.

When asked to allocate the percentage of total training costs related to new technology, a distinctive trend is evident. In all industries, there is expected to be a definite increase in technology training as a percent of total training costs between 1981 and 1995.

The survey results for questions on training costs are shown in Table 25. The table shows there is considerable variability by industry.

TABLE 25: SUMMARY - SELECTED SERVICE INDUSTRIES

Organizations' Training Costs 1985-1995

SIC	Industry	Training Costs as a Percent of Labour Costs (1)					Percent of Total Training Costs Related to New Technology (2)				
		Estimated			Expected		Estimated			Expected	
		1981	1984	1985	1990	1995	1981	1984	1985	1990	1995
701	Chartered Banks	2.0	2.5	2.5	2.0	2.0	26	22	28	38	37
701	Trust Companies	0.5	3.0	3.5	4.0	4.0	12	30	36	45	43
721	Life Insurance	4.5	5.0	5.5	7.0	7.0	41	60	59	62	64
721	General Insurance	2.5	3.0	4.0	4.5	5.0	23	24	39	44	39
735	Insurance Brokers	1.0	1.5	2.0	2.5	3.0	23	34	36	35	36
909	Federal Government	3.0	2.5	3.0	4.0	4.0	23	28	31	42	45
931	Provincial Government	1.5	1.5	2.0	1.5	1.5	28	35	42	48	50
951	Local Government	1.5	2.0	2.0	3.0	4.5	32	45	46	57	56
544	Telephone Systems and Interconnects	6.0	10.0	13.5	9.0	9.0	59	83	83	77	77
545	Telegraph and Cable Systems	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
631	Food Stores (3)	1.0	1.0	1.0	1.5	1.5	20	20	20	35	35
642	General Merchandise Stores	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
853	Computer Services	3.0	11.5	12.5	10.0	10.0	35	53	53	57	57
867	Management and Business Consultants	3.0	4.0	4.0	4.0	4.0	29	45	48	47	44

(1) Rounded to closest 0.5%.
(2) Rounded to closest 1%.
(3) Based on expert interviews only.

Exhibit 14, below, compares the service industries investigated to the average of all firms interviewed, in terms of training costs as a percentage of labour costs, and the percentage of training costs related to new technology as higher than average (+), about average (o) or below average (-). It suggests that one industry - Telephone Systems - leads in training persons for new technologies. The industries which appear to be lagging and below average are Insurance Brokers, Chartered Banks and General Insurance.

EXHIBIT 14

COMPARISON OF TRAINING COSTS

Industry	Training Costs As a Percent of Total Labour Costs	Percent of Training Costs Related to New Technology
Chartered Banks	o	-
Trust Companies	o	o
Life Insurance	+	o
General Insurance	o	-
Insurance Brokers	-	-
Federal Administration	o	o
Provincial Administration	-	o
Local Government	-	o
Telephone Systems	+	+
Telecommunications	n.a.	n.a.
Retail Food	-	-
General Merchandise	-	-
Computer Services	+	o
Business Consultants	+	o

\+ Above average for all reporting Service Organizations
o About average for all reporting Service Organizations
\- Below average for all reporting Service Organizations
n.a. Not available

TABLE 26: SUMMARY - SELECTED SERVICE INDUSTRIES

Union Representation in Organizations

SIC	Industry	Percent of Organizations With Union Representation (1)	Of Organizations with Union, Percent of Employment Unionized (1)			
			Estimate		Expected	
			1984	1985	1990	1995
701	Chartered Banks	25	1 (2)	1 (2)	1 (2)	1 (2)
701	Trust Companies	30	1 (2)	1 (2)	1 (2)	1 (2)
721	Life Insurance	0				
721	General Insurance	0				
735	Insurance Brokers	5	15	15	10	15
909	Federal Government	100	85	85	85	85
931	Provincial Government	100	80	80	80	80
951	Local Government	100	85	85	85	85
544	Telephone Systems and Interconnects	20	n.a.	n.a.	n.a.	n.a.
545	Telegraph and Cable Systems	100	40	45	50	50
631	Food Stores (3)	65 (4)	90	90	90	90
642	General Merchandise Stores	n.a.	n.a.	n.a.	n.a.	n.a.
853	Computer Services	0	-	-	-	-
867	Management and Business Consultants	0	-	-	-	-
	AVERAGE FOR REPORTING ORGANIZATIONS	40	70	65	65	65

(1) Rounded to closest 5%.
(2) Approximately 1%.
(3) Based on expert interviews only.
(4) Based on percent of sales by type of outlet.
n.a. - not available

6.0 LABOUR RELATIONS ENVIRONMENT

This chapter discusses the survey results for firms and unions regarding the labour relations environment in the selected service industries.

6.1 Trends in Unionization

The service sector sample firms indicated a great degree of variation in union representation at an industry level, as shown in Table 26. Federal, Provincial and Local Governments, Telephone Systems (exclusive of Telephone Interconnect firms), and Telegraph and Cable Systems industries were all unionized. However, a number of industries such as the Life and General Insurance, Computer Services and Management and Business Consulting industries had no union representation. Of the Bank and Trust Company respondents, 23% and 28%, respectively, had union representation, but less than 1% of the employees were represented.

Union representation, among organizations with unions, is expected to grow in only one service industry, Telegraph and Cable Systems, from 40% to 50% between 1984 and 1995. The respondents in firms in other industries such as Banks and Trust Companies (1%), Insurance Brokers (15%), Federal Government (85%), Provincial Government (80%), Local Government (85%), Life Insurance (0%), General Insurance (0%), Computer Services (0%) and Management and Business Consultants (0%) expect no change in union representation over the next decade.

TABLE 27: SUMMARY - SELECTED SERVICE INDUSTRIES

Unions and Technology Change

SIC	Industry	Percent of Organizations with a Union (1)	Percent of Contracts with a Technology Change Clause (1)	Percent of Technology Change Clauses Covering (1)					
				Notice	Consult	Job Security	Joint Committee	Seniority	Other
701	Chartered Banks	25	75	100	100	100	0	65	35
701	Trust Companies	30	0						
721	Life Insurance	0							
721	General Insurance	0							
735	Insurance Brokers	5	0						
909	Federal Government	100	80	55	75	55	30	0	5
931	Provincial Government	100	90	80	80	80	45	45	20
951	Local Government	100	65	45	45	35	10	50	40
544	Telephone Systems and Interconnects	20	100	100	65	35	0	35	35
545	Telegraph and Cable Systems	100	100	50	65	85	50	100	50
631	Food Stores	65	(2)	(2)	(2)	(2)	(2)	(2)	(2)
642	General Merchandise Stores	n.a.	n.a.						
853	Computer Services	0							
867	Management and Business Consultants	0							
	AVERAGE FOR REPORTING ORGANIZATIONS		75	60	65	45	25	40	25

(1) Rounded to nearest 5%.
(2) Relatively common among large supermarket chains. Features ranked in order of frequency: consultation, advance notice, job security.
n.a. - not available

6.2 Technology Change Clauses

Table 27 shows the percentage of collective agreements, by industry, which have a technology change clause. As a benchmark for comparison, the percentage of firms with a union(s) is also shown. The table also shows the percentage of the technology change clauses with various features (e.g., notice or job security).

The table shows that, on average, 75% of the service industries with a collective bargaining agreement have a technology change clause, but only about 60% of these clauses cover a statement on advanced notice. More common in the clauses is a commitment to consult the union prior to implementing technology changes affecting employees. Job security is covered by clauses in all industries with technology change clauses in force, being present in about 45% of these clauses. Seniority is another common feature in many industries with union contracts. Provisions for joint management and labour committees are most common in the Federal and Provincial Governments and the Telegraph and Cable Systems Industry.

6.3 Management's Perception of Union's Position on New Technology

Management and union respondents were asked an open-ended question on what the union's position on the adoption of new technologies has been.

An interesting finding is that a high percentage of management responses, in several key industries with a high degree of unionization, acknowledged in their statements that the union accepts the need for new technology. Approximately 50% of the Federal Government, 45% of the Local Government and 50% of the Telegraph and Cable systems management responses cited that the union accepts the need to adopt new technology. In survey research, these high percentage rates, given in response to an open-ended, unbiased question, are considered significant. Similarly, virtually all union respondents in these same industries acknowledged the necessity to adopt new technology.

None of the management responses to this question implied that the union membership accepts new technology while the union leadership resists it. This theme, however, did emerge, at times in some expert interviews.

Management and union responses to the question of the union's position on new technology were also coded to identify different perceptions of the concerns of the union as it relates to technology change. The following list compares the concerns mentioned by management and union respondents from the most commonly to least commonly cited.

Unions Concerns With Technology Change
Ranked in Order of Frequency Mentioned

Management Perceptions of Union	Union Leaders Perceptions of Union
• Job Security	• Retraining
• Retraining	• Job Security
• Impact on Union Membership	• Share of Benefits
• Share of Benefits	• Control of Technology

The results show that the union respondents see retraining as their unions' number one issue. It was mentioned universally, in both the survey and expert interviews with union leaders, as organized labour's most critical concern. Job security was the second most common concern of union leaders. In general, they viewed retraining as the chief measure to reduce the negative effects and to enhance the positive benefits of new technology adoption. Important concerns, but less frequently mentioned by union leaders, were: the desire to gain a share of the benefits of new technology adoption for their members, and the issue of who controls the new technology. An example of the latter concern is electronic monitoring and surveillance of employees.

As can be seen from the above, management perceptions of their unions' chief concerns are close to those of the union leaders. Management sees job security as the unions' number one interest, followed by retraining. Management also perceives that the unions are concerned about their own organizational self interest. Management also perceives that unions want to secure a portion of new technology benefits.

TABLE 28: SUMMARY - SELECTED SERVICE INDUSTRIES

Nature of Worker Involvement in the Process of Technology Change

SIC	Industry	Percent of Organizations with a Formal Mechanism for Worker Participation in: Setting Production and/or Sales Targets: At Company Level	At Division/ Plant Level	At Department/ Area Level	At Working Group Level	Improving Productivity/ Quality	Adoption of New Technology
701	Chartered Banks	15	20	70	50	35	25
701	Trust Companies	60	60	40	50	70	40
721	Life Insurance	50	40	70	40	75	35
721	General Insurance	25	20	40	40	45	10
735	Insurance Brokers	65	80	80	80	80	55
909	Federal Government	25	20	20	40	55	85
931	Provincial Government	10	0	0	0	35	35
951	Local Government	0	20	0	0	50	30
544	Telephone Systems Interconnects	50	40	40	60	60	55
545	Telegraph and Cable Systems	0	0	0	50	75	0
631	Food Stores (2)	0	0	0	0	0	0
642	General Merchandise Stores (2)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
853	Computer Services	25	35	50	40	60	60
867	Management and Business Consultants	10	20	70	35	70	50
	AVERAGE FOR REPORTING ORGANIZATIONS	30	30	40	40	55	45

(1) Rounded to closest 5%.
(2) Based on expert interviews only.
n.a. - not available

6.4 Formal Mechanisms for Worker Participation

Organizations in the service industries were asked to indicate whether they had a formal mechanism for worker participation in:

- setting production and/or sales targets at various levels in the organization,
- improving productivity/quality,
- adopting new technology.

The survey results for all firms, by industry, are shown in Table 28.

Overall, the table suggests that:

- Approximately half of all organizations report having some type of formal mechanism for employee participation in setting production and/or sales targets at some level in the organization. The public sector organizations are least likely to have such a mechanism while the incidence in the private sector service firms surveyed, overall, is close to 60%.
- Approximately 55% of all service sector firms surveyed report having some type of formal mechanism for employee participation in improving productivity and/or quality.
- Finally, approximately 45% percent of the service sector firms surveyed report having some type of formal mechanism for employee participation related to adopting new technologies.

EXHIBIT 15

COMPARISON OF FORMAL MECHANISMS FOR WORKER PARTICIPATION

Industry	Setting Production and/or Sales Targets	Improving Productivity Quality	Adopting New Technology	Overall Rating on Worker Participation
Chartered Banks (1)	+	-	-	-
Trust Companies	+	+	o	+
Life Insurance	+	+	-	-
General Insurance	o	-	-	-
Insurance Brokers	+	+	+	+
Federal Administration	-	o	+	o
Provincial Administration	-	-	-	-
Local Government	-	o	-	-
Telephone Systems	+	-	+	+
Telecommunications	-	+	-	-
Retail Food(1)	-	-	-	-
General Merchandise(1)	n.a.	n.a.	n.a.	n.a.
Computer Services	+	+	+	+
Business Consultants	+	+	+	+

\+ Above average for all reporting Service Organizations
o About average for all reporting Service Organizations
\- Below average for all reporting Service Organizations

(1) Based on expert interviews.

n.a. Not available

Exhibit 15 compares the organizations' responses by service industry as above (+), below (-) or about average (o) in terms of the reported incidence of formal mechanisms for employee participation for the service industries surveyed. It also provides an overall rating in terms of reported mechanisms for employee participation as above or below average for the selected service industries.

In terms of production or sales targets, firms in the following industries are reported most likely to have formal mechanisms at some level in the organization:

- Banks,
- Trusts,
- Brokers,
- Telephone Systems,
- Computer Services, and
- Business Consulting.

In terms of improving productivity or quality, firms in the following industries are reported most likely to have a formal mechanism:

- Trusts,
- Life Insurance,
- Telephone Systems,
- Telecommunications Carriers,
- Computer Services, and
- Business Consulting.

In terms of technology adoption, firms in the following industries are reported most likely to have a formal mechanism:

- Brokers,
- Federal Government,
- Telephone Systems,
- Computer Services, and
- Business Consulting.

TABLE 29: SUMMARY - SELECTED SERVICE INDUSTRIES

To What Extent and How Should Management Involve Workers In Decisions on Adopting New Technology?

(Percent of Organizations) (1)

SIC	Industry	Full Involvement	Prior Consultation	Committees	Explanation of Need	Advance Notice	Keep Employees Informed	Training Programs	No Involvement
701	Chartered Banks	60	15	0	25	0	15	0	25
701	Trust Companies	45	10	0	30	0	0	0	15
721	Life Insurance	60	20	40	0	0	0	20	0
721	General Insurance	60	0	15	15	0	15	0	0
735	Insurance Brokers	15	30	0	30	0	60	0	30
909	Federal Government	25	40	15	0	15	20	0	0
931	Provincial Government	0	55	25	20	0	20	25	15
951	Local Government	30	20	10	10	10	25	0	10
544	Telephone Systems and Interconnects	0	60	20	20	0	20	20	40
545	Telegraph and Cable Systems	0	50	0	0	0	50	0	50
853	Computer Services	25	25	25	0	25	0	50	0
867	Management and Business Consultants	10	0	0	0	0	40	50	0
	AVERAGE FOR REPORTING ORGANIZATIONS	25	30	15	10	5	20	15	15

(1) Rounded to closest 5%.

Industries with a high percentage of managerial, professional, technical and sales personnel (i.e., Insurance Brokers, Computer Services, Business Consulting) appear consistently to have more opportunities for worker participation. Of the industries with more structured organizations, the Trust and Life Insurance industries appear to have the most opportunities for employee participation.

6.5 Views on Involving Employees in Decisions on Adopting New Technology

Respondents were asked an open-ended question as to what extent and how management should involve employees in decisions on adopting new technology. The responses are summarized in Table 29 by industry and type of response. The responses range from "full" involvement to "no" involvement.

Few union responses were received due, primarily, to their low level of involvement in the service sector. Union responses were received from the Federal Government, Local Government, Telephone and Telegraph and Cable Systems industries. More than half indicated full involvement while all other respondents indicated some degree of participation. No union respondents cited "no involvement" as appropriate.

In general, the service industries, particularly the smaller firms, are characterized by more informal mechanisms for discussion and consultation.

Management expressed a wide range of answers fairly evenly distributed among the categories shown in Table 29.

Full involvement is expressed as desirable by a majority of respondents in the Banking and Insurance industries as well as a large number of Trust Companies.

A few firms indicate that no involvement is preferable, primarily because of the speed at which technological changes are occuring and the specialized knowledge required to decide what technologies are most applicable.

The most common responses show a preference for prior consultation and keeping employees informed of the decision making and/or the implementation of any changes in technology adoption.

Several cautionary notes should be applied in reviewing Table 29.

1. The survey results show how specific managers in a sample of firms in each industry feel about employee involvement. It does not indicate how firms act.

2. Table 29 attempts to identify industry patterns and, as such, masks how individual firms within a single industry view employee involvement. As Table 29 demonstrates, there are variations within a single industry.

3. The results should not be viewed as statistically significant for this question because the sample of firms in any one industry was relatively small, and not all respondents provided an answer to this question. Furthermore, the sample and sample frame was structured by employment size, not by a firm's attitude towards industrial labour relations.

7.0 PLANNING FOR TECHNOLOGICAL CHANGE

The following chapter reports the results of the survey regarding questions related to planning for technology change. Table 30 summarizes the results.

7.1 Long-term Strategic Plan

Of the firms surveyed, 63% have long-term strategic plans. The firms with the highest positive response rates were in the Banks (100%), the Telegraph and Cable Systems (100%), the Federal Government (87%), the Management and Business Consultants (81%) and Life Insurance (79%) industries. Local governments are the least likely to have a plan (19%).

7.2 Human Resource Plan

Over 55% of the firms in the selected Service Industries surveyed reported having a human resource plan. The average length of the planning horizon is six years.

Firms most likely to have a plan are in the Telegraph and Cable Systems (100%), Chartered Banks (91%), Federal Government (87%) and General Insurance (72%) industries.

The firms least likely to have a human resource plan are in the Telephone Systems (20%), and Local Government (40%) industries.

7.3 Capital Investment Plan

Less than 50% of the firms have capital investment plans dealing with new technologies. The average planning period for firms with such plans is five years. The most likely firms to have capital investment plans are in the Telegraph and Cable Systems

TABLE 30: SUMMARY - SELECTED SERVICE INDUSTRIES

Planning for Technological Change

SIC	Industry	Strategic Plan	Human Resource Plan		Capital Investment Plan		Perceived Integration Between Capital and Human Plans (2)
		Percent of Organizations With Plan	Percent of Organizations With Plan	Length of Planning Horizon (1) (Years)	Percent of Organizations With Plan	Length of Planning Horizon (1) (Years)	
701	Chartered Banks	100	91	6	72	4	3.8
701	Trust Companies	73	53	5	25	6	4.5
721	Life Insurance	79	52	4	31	6	2.2
721	General Insurance	75	72	6	59	5	2.6
735	Insurance Brokers	46	61	5	42	5	3.0
909	Federal Government	87	87	4	87	5	2.1
931	Provincial Government	71	57	4	57	4	2.8
951	Local Government	19	40	5	40	5	1.3
544	Telephone Systems and Interconnects	67	20	6	36	7	2.6
545	Telegraph and Cable Systems	100	100	7	100	14	3.8
853	Computer Services	40	40	4	20	5	5.0
867	Management and Business Consultants	81	54	4	23	4	4.2
	AVERAGE FOR REPORTING ORGANIZATIONS	63	56	5	44	5	2.8

(1) Rounded to closest percent.
(2) Counts 1984-1985 as one year.
(3) Using a scale of 1 to 5: 1 represents "Not at all integrated" and 5 "Highly integrated".

(100%), Federal Government (87%) and Chartered Bank (72%) industries. Those firms least likely to have capital plans are in the Computer Services (20%), Management and Business Consultants (23%) and the Trust Company (25%) industries.

7.4 Perceived Integration Between Capital and Human Resource Plans

On average, firms in the Service Industries indicated a modest degree of integration between their human resource and capital investment plans. The overall average for the Service sector is 2.8 on a scale of 1 ("not at all integrated") to 5 ("highly integrated"). Therefore, a rating of 3, in the middle of the scale, would represent a fair degree of integration.

The firms with the highest level of integration are in the Computer Services (5.0), Trust Companies (4.5) and Management and Business Consultants (4.2) industries. It is interesting to note that these industries also indicated low responses to having plans. It seems that those that do plan, in these industries, have a high degree of integration between human resource and capital plans.

The public sector showed a low level of integration overall, with Local Government rating its plans as the least integrated.

7.5 Conclusion

Exhibit 16 summarizes the planning capability of the firms in each industry as above (+), below (-) or about average (o), relative to the average for all service industries surveyed on the questions asked. In addition, each industry is rated in terms of its overall planning capability.

Five industries achieved strong ratings: Chartered Banks, General Insurance, Federal Government, Telecommunications and Retail Food. The weakest industry in terms of planning capability was Local Government.

EXHIBIT 16

COMPARISON OF PLANNING CAPABILITIES

	Strategic Plan	Human Resources Plan	Capital Plan	Capital/ Human Resource Integration	Overall Rating of Planning Capability
Chartered Banks	+	+	+	+	Strong
Trust Companies	+	o	-	+	Modest
Life Insurance	+	o	-	-	Modest
General Insurance	+	+	+	o	Strong
Insurance Brokers	-	o	o	o	Modest
Federal Administration	+	+	+	-	Strong
Provincial Administration	o	o	+	o	Modest
Local Government	-	-	-	-	Weak
Telephone Systems	+	-	-	o	Modest
Telecommunications	+	+	+	+	Strong
Retail Food(1)	+	+	+	+	Strong
General Merchandise	n.a.	n.a.	n.a.	n.a.	n.a.
Computer Services	-	-	-	+	Weak
Business Consultants	+	o	-	+	Modest

\+ Above average for all reporting Service Organizations
o About average for all reporting Service Organizations
\- Below average for all reporting Service Organizations

(1) Based on expert interviews.

n.a. Not available or no answer.

APPENDIX A

SELECTED SERVICE INDUSTRIES

DESCRIPTION OF SAMPLE FRAME

BANKS AND TRUSTS SIC 701

The sample frame for the survey of this industry included chartered banks and trust companies with fifty (50) or more employees in Ontario.[1] Employment in these financial institutions (i.e., 50 or more employees) are estimated to include 99% of the approximately 64,200 employees working in banks and 20,000 employees working in trust companies in Ontario.

Sample Frame

	701 Banks	701 Trusts
Small (50-199)	7	11
Medium (200-999)	4	6
Large (1,000+)	5	5
Total	16	22

1. The source for banks was the Canadian Bankers' Association. Through a telephone survey, banks with 50 or more employees in Ontario were identified.

   The Source for trust companies was the Report of the Registrar of Business of 1981, Loan and Trust Corporations, 85th Report, Ontario Ministry of Consumer and Commercial Relations. Through a telephone survey, trust companies with 50 or more employees in Ontario were identified.

INSURANCE CARRIERS SIC 721

The sample frame for the Insurance Industry survey of life and general insurance carriers included all firms with a base of operation in Ontario and $10 million or more in annual premium incomes in Ontario. Employment in these firms is estimated to represent 90% of the 31,200 Ontario employees in the life insurance industry and 95% of the 20,000 Ontario employees in the general insurance industry.(1)

INSURANCE BROKERS (PART OF SIC 735)

The survey sample frame for insurance brokers included all firms with fifty (50) or more employees. These firms represent only about 20% of Ontario employment in this industry as it is dominated by a large number of small firms.(2)

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(1) The source for life insurance companies and premium data (1981) was the Annual Report of the Superintendent of Insurance for Ontario, 1982, Ontario Ministry of Consumer and Commercial Relations. Ontario-based firms were established through the directory listing in the May, 1984, statistical issue of the Canadian Underwriter.

The source for general insurance companies and premium data (1983) was the May, 1984, statistical issue of the Canadian Underwriter. These data excluded accident sickness, and reassurance premium income. Ontario-based firms were established through directory listing in the same issue.

(2) The source for insurance brokers was the directory of the Registered Insurance Brokers of Ontario (RIBO). RIBO supplied a distribution of firms by employment size, but was unable to provide a list of firms by size. For this latter information, the 1984 Dunn & Bradstreet file was used.

		Sample Frame		
		721 Life Insurance Carriers (1)	721 General Insurance Carriers (1)	735 Insurance Brokers
Small	(50-199)	7	27	39
Medium	(200-999)	5	22	6
Large	(1,000+)	14	2	0
	Total	26	51	45

(1) Estimated by correlating actual Ontario employment of insurance carriers sampled to data on Ontario premium income of carriers in sample frame.

PUBLIC ADMINISTRATION SIC 901, 931, 951

For the survey of federal (SIC 909)[1] and provincial (SIC 931)[2] public administration, government departments were treated as separate organizations and structured by employment size category. Federal government departments with 500 or more employees in Ontario, and provincial ministries with 200 or more employees[3] were included in the sample frame. In both the federal and provincial governments, a few departments, which are dominated by occupations not selected for study by the Task Force, were excluded.[4] The departments in the sample frame represent 76% of the approximately 91,000 federal[5] and 80% of the approximately 84,000 provincial public administration employees in Ontario.

For the survey of municipal governments (SIC 951), the sample frame included all Ontario municipal corporations with 500 or more employees.[6] These larger local governments include 78% of the 107,500 municipal employees in Ontario.

1. SIC 909 "Other Federal Administration" excludes National Defense - enlisted and civilian personnel (which is SIC 902) and Canada Post (which is SIC 548).

2. SIC 931 excludes hospitals, educational institutions, and Crown Corporations such as Ontario Hydro.

3. Ministry stratification included classified civil servants (full-time, permanent civil servants) only. It excluded Crown employees, casual, contract and seasonal employment.

4. A few departments, dominated by occupations not selected for investigation by the Task Force, were excluded from consideration in the survey.

   In the Federal Government, the following Departments were excluded from consideration: Justice, Royal Canadian Mounted Police and Correctional Services. In the Provincial Government, the following Ministries were excluded from consideration: Attorney General, Solicitor General and Correctional Services.

	Sample Frame		
	909 Federal	931 Provincial	951 Local
Small	n.a. (20-499)	n.a. (20-199)	n.a. (20-499)
Medium	7 (500-999)	6 (200-999)	18 (500-999)
Large (1,000+)	15 22	13* 19	21 39

n.a. Not applicable

* Includes Workers' Compensation Board.

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5. The 1981 Census reports 105,400 employees resident in Ontario and working in SIC 909. The 91,000 figure is based upon a special run by the Public Service Commission of Canada, "Population Reporting File", September, 1984" and reflects place of work data.

6. Includes upper tier (i.e., counties, regional and metropolitan municipalities) and lower tier governments (i.e., cities, boroughs, towns, villages).

Note: The percentage figures indicate the share of all federal employees in departments with 500 or more employees in Ontario and the share of all provincial employees in ministries with 200 or more employees. The estimate of federal employees in Ontario is from the "Population Reporting File", September, 1984, Public Service Commission. The estimate of provincial employees in Ontario is the Ontario Public Service Commission, March, 1984, plus employment in the Ontario Workers' Compensation Board. Provincial employment includes classified, unclassified and Crown employees.

TELEPHONE SYSTEMS SIC 544

The sample frame for the Telephone Systems Industry included all telephone systems[1] and telephone interconnect firms[2] with twenty (20) or more employees in Ontario. Employment in the sample frame firms is estimated to represent 99% of the approximately 27,000 Ontario employees in telephone system companies and 86% of the approximately 3,300 Ontario employees in telephone interconnect companies.

TELECOMMUNICATIONS CARRIERS SIC 545

The sample frame for the Telecommunications Industry included all four telecommunications carriers in Ontario.[3] These firms represent 100% of the approximately 2,500 Ontario employees in this industry.

SAMPLE FRAME

	Telephone Systems 544			545
	Systems	Interconnects	Total	Telecommunications
Small (20-199)	3	27	30	2
Medium (200-999)	2	4	6	1
Large (1,000+)	1	0	1	1
Total	6	31	37	4

1. The source for telephone systems was the Ontario Telephone Service Commission, 1983 Annual Report. A telephone survey identified companies with 20 or more employees in Ontario.
2. The source for telephone interconnect firms and employment was the Canadian Interconnect Directory, Northern Business Information Limited, 1984.
3. The source for these firms is Telecommunications Statistics, Catalogue No. 56-201. Employment was established through a telephone survey.

GENERAL MERCHANDISE SIC 642

The sample frame for the General Merchandise Industry included all organizations with 100 or more employees.[1] These organizations in the sample frame represent approximately 83% of all employment in this industry in Ontario.[2]

RETAIL FOOD STORES SIC 631

The sample frame for Retail Food Stores includes all organizations with 100 or more employees in Ontario.[3] The sample frame organizations together have about 97% of the approximately 88,000 Ontario employees in this industry.[4]

	631 Food Stores	642 General Merchandise
Small (20-199)	15	1
Medium (200-999)	17	2
Large (1,000+)	13	9
	45	12

1. The source for organizations was the Retail Trade Section of Statistics Canada. Employment per organization was determined through a telephone survey.

2. The 1981 Census reports 103,160 Ontario residents employed in SIC 642.

3. The source for companies was the Canadian Grocer, August, 1983. Estimates of employment utilized a combination of a telephone survey and estimate procedure which multiplied the number of outlets times an average number of employees per store, using Dun & Bradstreet data.

4. The 1981 census reports 92,385 residents employed in SIC 631 in Ontario.

COMPUTER SERVICES SIC 853

The sample frame for the survey of Computer Service firms included full members of the Canadian Association of Data Processing (CADAPSO) with operations in Ontario.[1] These firms are estimated to include approximately 70% of the sales in the industry.[2]

Sample Frame

	853 Computer Services	867 Business Consulting
Small (under 200)	36	32
Medium (200-999)	5	8
Large (1000+)	0	0
	41	40

MANAGEMENT AND BUSINESS CONSULTANTS SIC 867

The Management and Business Consultants Industry (SIC 867) included consultants in actuarial, personnel, customs, economics, public relations and management services.

The sample frame includes all firms with twenty (20) or more employees in Ontario.[3] These firms (i.e., with 20 or more employees) represent approximately half of the 11,000 Ontario employees in this industry.[4]

1. Ontario operations were identified through CADAPSO membership files and telephone directories. Employment of individual firms was estimated by correlating a sample of firms using Dun & Bradstreet data on employment with revenue data from CADAPSO.

2. The 1981 Census shows 16,775 residents employed in SIC 853 in Ontario.

3. The source for these firms includes members of the Canadian Association of Management Consultants, The Financial Post 500, Summer 1984, the Canadian Public Relations Society, Dun & Bradstreet and the Canadian Association of Customs Brokers. Employment data were supplemented through telephone surveys.

4. The 1981 Census shows 10,975 residents employed in SIC 853 in Ontario.

APPENDIX B

FIRM EMPLOYMENT SIZE CATEGORIES USED IN THE SURVEY OF SELECTED SERVICE INDUSTRIES

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FIRM EMPLOYMENT SIZE CATEGORIES USED IN THE SURVEY OF SELECTED SERVICE INDUSTRIES

Size Categories Used to Stratify the Sample Frame	Size Categories Used to Weight and Report Survey Results	
Number of Employees		Number of Employees
20 - 49	Small	20 - 199
50 - 99		
100 - 199		
200 - 499	Medium	200 - 999
500 - 999		
1000 - 1499	Large	1000 or more
1500 - 2499		
2500 - 4999		
5000 or more		

APPENDIX C

RELIABILITY OF THE SAMPLE

SAMPLE RELIABILITY

The sample reliability is summarized with other sample and population characteristics in "Table 1". The sample was selected as a three stage stratified random sample. The purpose of this stratification was to reduce the error variance in the measurement of organization size by increasing the homogeneity of each group of organizations within each strata.

The first stage consisted in creating two industry sectors (i.e. manufacturing and services). The second stage involved dividing up each industry sector into nine and fourteen industrial sub-classes respectively and according to Standard Industrial Classification codes (see Table 1). The third stage was to further stratify each SIC into three more homogeneous size groups:

Manufacturing Sector	Service Sector
Small 20- 99 employees	20-199 employees
Medium 100-499 employees	200-999 employees
Large 500+ employees	1,000+ employees

Exceptions to these three size groupings are as follows:

SECTOR	ORGANIZATION SIZE EXCLUSION
Manufacturing Sector	
291 Iron & Steel Mills	less than 500
321 Aircraft & Aircraft Parts	less than 50
Service Sector	
701 Banks and Trusts	less than 50
721 General and Life Insurance	less than 50
735 Insurance Brokers	less than 50
909 Federal Government	less than 500
931 Provincial Government	less than 200
951 Local Government	less than 500

Overall, the sample yields a relatively high reliability level in reflecting the employment level of those sectors surveyed. For instance, for the Chartered Banks Industry, the sample yields a minimum confidence level of about 95 percent with an associated allowable error of 5 percent. That is, we would expect that the estimated employment level for the sector has a 95 percent chance of being within $\pm$ 5 percent of the actual employment level found in the frame. Or stated alternatively, if 100 independent random samples were drawn, in 95 of these samples we would expect to have an estimated employment level within $\pm$ 5 percent of the actual employment level found in the sample frame.

TABLE 1: SUMMARY - SELECTED SERVICE INDUSTRIES

SAMPLE FRAME AND SAMPLE

SIC	SIC NAME	UNIVERSE		SAMPLE FRAME				SAMPLE				
		Number of Firms	Number of Employees	Firm Size Cut Off	Number of Firms	Number of Employees	Share of Universe	Number of Firms	Number of Unions	Number of Employees	Reliability Level (min.) (Percent)	Allowable Error (Percent)
701	Chartered Banks	68	64,200	50	16	60,300	94	8		43,883	95	5
701	Trust Companies	41	20,000	50	22	19,000	95	6		8,466	90	15
721	Life Insurance	45	31,200	$10 MM	26	28,200	90	6		6,355	95	5
721	General Insurance	94	20,000	$10 MM	51	19,000	95	8		2,128	95	9
735	Insurance Brokers	2,737	31,600	50	45	6,300	20	8		1,213	90	11
909	Federal Government	67	91,000	500	22	69,000	76	8	2	28,350	90	11
931	Provincial Government	37	84,000	200	19	67,000	80	8		37,599	90	11
951	Local Government	837	107,474	500	39	83,782	78	10	7	23,832	90	13
544	Telephone Systems and Interconnects	111	30,423	20	37	29,430	97	8	1	26,444	90	23
545	Telegraph and Cable Systems	4	2,543	20	4	2,543	100	3	1	2,116	90	20
631	Food Stores	n.a.	87,600	100	45	85,000	97		Expert Interviews Only			
642	General Merchandise Stores	n.a.	92,000	100	12	76,000	83		Expert Interviews Only			
853	Computer Services	n.a.	16,775	20	41	11,800	70	6		291	90	17
867	Management and Business Consultants	n.a.	10,975	20	40	5,900	54	8		1,070	95	6

FINAL REPORT AND APPENDICES OF THE ONTARIO TASK FORCE ON EMPLOYMENT AND NEW TECHNOLOGY

Final Report — Employment and New Technology

Appendices:

1. Labour Market Trends in Ontario, 1950-1980
2. Occupational Employment Trends in Ontario, 1971-1981
3. Emerging New Technology, 1985-95: Framework for a Survey of Firms
4. Employment and New Technology in Ontario's Manufacturing Sector: A Summary of Selected Industries
5. Employment and New Technology in the Iron and Steel Industry
6. Employment and New Technology in the Metal Fabricating Industry
7. Employment and New Technology in the Machinery and Equipment Industry
8. Employment and New Technology in the Aircraft and Aircraft Parts Industry
9. Employment and New Technology in the Communications Equipment Industry
10. Employment and New Technology in the Office, Store and Business Machine Industry
11. Employment and New Technology in the Plastic Processing Industry
12. Employment and New Technology in Ontario's Service Sector: A Summary of Selected Industries
13. Employment and New Technology in the Chartered Banks and Trust Industry
14. Employment and New Technology in the Insurance Industry
15. Employment and New Technology in the Government Services Industry
16. Employment and New Technology in the Telecommunications Industry
17. Employment and New Technology in the Retail Trade Industry
18. Employment and New Technology in the Computer Services and Management Consulting Industry
19. Industry-Sector and Occupational Employment in Ontario, 1985-1995
20. Technological Change, Productivity, and Employment: Studies of the Overall Economy